Medical Lib.

AUG 21 1925

WHOLE SERIES, VOL. XLIX. No. 8. THIRD SERIES, VOL. XLI.

15, 1925

Library University of Mich. Ann Arbor. Mich. XI-26

THERAPEUTIC GAZETTE

A Monthly Journal of Practical Therapeutics

Edited by

H. A. Hare, M.D.

Professor of Therapeutics and Diagnosis in the Jefferson Medical College,

GENERAL THERAPEUTICS,

and

Edward Martin, M.D.

Formerly Professor of Surgery in the University of Pennsylvania,

SURGICAL AND GENITO-URINARY THERAPEUTICS.

THE SWIFT PUBLISHING COMPANY, - - DETROIT, MICHIGAN, U. S. A.

EDITORIAL OFFICE, N. W. Cor. 18th and Spruce Streets, PHILADELPHIA, PA.

FOREIGN OFFICES:

LONDON, ENGLAND—50 & 54 Beak St., Regent St., W. SYDNEY, N. S. W., AUSTRALIA—125 York St. WALKERVILLE, ONT., CANADA. MONTREAL, QUE., CANADA—45 St. Alexander St. BOMBAY, INDIA—Lloyd Bldg., Graham Road. HAVANA, CUBA—Amistad 126. BUENOS AIRES, ARGENTINA—Bartolome Mitre 1680.

Entered at the Post-Office at Detroit, Mich., as second-class mail matter.

COPYRIGHT, 1925, BY THE SWIFT PUBLISHING COMPANY.

An Effective Remedy *for*
Nervous Sleepless Patients

NEURONIDIA

Palatable Well-Tolerated Reliable

Allaying Restlessness and Producing Refreshing Sleep.

Especially indicated in insomnia from mental strain, neurasthenia and other neuroses; also an excellent sedative in sea-sickness.

Literature on Request

Schieffelin & Co.
NEW YORK

Important Therapeutic Indications in Diseases of the Urinary Tract

Fulfilled by

URIFORM

Highly recommended in the treatment of

CHRONIC URETHRITIS VESICAL CATARRH
PROSTATITIS VESICULITIS
PYELITIS

BECAUSE:
It sterilizes the Urine
Arrests Discharge
Reduces Congestion
Allays Pain

DOSE: One to two teaspoonfuls three times daily.

Literature and Sample on request.

Schieffelin & Co.
New York.

The Therapeutic Gazette

Whole Series Vol. XLIX | DETROIT, MICH., AUGUST 15, 1925 | Third Series Vol. XLI, No. 8

Original Articles

Quinine in Malarial Infections—A Symposium

The Editors of the THERAPEUTIC GAZETTE, thinking this topic of interest, sent to a number of physicians in those States of the Union in which the United States Census shows the greatest incidence of malaria, a series of questions designed to produce replies that would be of value to our readers. The questions and answers follow, being preceded by a brief but useful statement by Dr. C. C. Bass, Professor of Experimental Medicine in Tulane University, New Orleans, La., and Dr. W. M. James, Panama, R. P.

Our readers will recall that we have within the last few years discussed this topic at length in the editorial pages. The questions appended were instigated by the views expressed by those who, having a large experience in tropical medicine, have advocated or opposed large doses of quinine and who have also written as to its value or danger in the presence of hematuria or hemoglobinuria.

We think it interesting that, in general terms, the appended replies indicate that relatively small doses are now considered efficient rather than the very large ones employed some years ago. Thayer was one of the first in this country to point out that if a patient was made to rest small doses would prove quite adequate, probably because the patient's vital resistance aids the quinine. Much more recently it will be recalled that no less a person than Sir Ronald Ross has done likewise, although he insists on the use of the drug for many weeks, as does Dr. Bass.

By C. C. Bass, M.D.

In the treatment of malaria, one of the chief purposes is relief of clinical symptoms; the other is to cure the infection in order to prevent relapse and also to prevent the individual from being a malaria carrier and a potential source of malaria to others.

The clinical symptoms are relieved in all cases by a sufficient amount of quinine and always within a comparatively short length of time. I personally have not been able to find a case that required more than three days of proper quinine treatment to stop the chief clinical symptoms, namely, fever or chills and fever. Some cases require considerably larger doses of quinine than others to accomplish this result. In many instances, 10 grains of quinine per day or even considerably less will stop the clinical symptoms within a period of three or four days. Twenty grains per day will stop the symptoms in nearly but not quite all cases. Thirty grains per day stops the symptoms in all cases, so far as I personally know. Notwithstanding the opinion held by others that larger doses of quinine are needed and that clinical symptoms may not be controlled unless still larger doses than 30 grains per day are given, I have personally been unable to find a single case of this kind. Although it is admitted that there may be such cases, they certainly are very rare.

If one had any way of determining in advance the amount of quinine that would be necessary to stop the clinical symptoms in any given case, of course only that amount should be employed. Unfortunately, there is no method of examination and no way of determining exactly the amount of quinine that will be required to stop the clinical symptoms in any given case. Some of those in which the symptoms are quite mild require much larger doses than others in which the symptoms are much more severe. This being the case, the only cer-

tain way of controlling the symptoms in any given case is to give an amount of quinine known to be sufficient to control the symptoms in all cases. Fortunately this amount, 30 grains per day, is not harmful and usually does not have a very unpleasant effect upon the patient. Practically anybody can take 30 grains of quinine a day.

Although the effect upon the clinical symptoms of the disease would probably be exactly the same whether the daily dose of 30 grains of quinine should be given in one large dose or whether it should be given in many small doses, a single large dose does cause more discomfort to the patient. For that reason it seems that it would be better to give the daily dose in at least three or more divided doses.

After the clinical symptoms have been relieved, the patient is still infected in most instances. If the treatment should be discontinued at this time, the patient usually relapses sooner or later and is a malaria carrier, a potential source of infection to others, during all of the time. Our next purpose is to cure the infection. Here again a larger dose may be required by one individual than by another, and a much longer period of treatment may be required by one than by another. We have no way by which we can determine the length of time it will be necessary to keep up treatment to cure the infection in any given individual, nor can we determine the minimum dose that will be required to obtain this result. Therefore we must select a treatment that is reasonably certain to be sufficient in all cases.

Five grains of quinine daily will cure the infection in quite a large per cent of people if kept up for a sufficient length of time. On the other hand, quite a good many will not be cured of their infection by this amount, and, in fact, some will actually develop clinical symptoms while taking as much as 5 grains of quinine daily. Ten grains of quinine daily will prevent the development of clinical symptoms in practically 100 per cent of individuals, and will cure the infection in practically all if kept up for a sufficient length of time. It is about the minimum dose that will accomplish this result and therefore is about the minimum that should be prescribed for this purpose.

Ten grains of quinine daily will cure the infection within a few days in some individuals. In others it requires three or four weeks and in others considerably longer than that time. It cures the infection in from 90 to 95 per cent of cases if given for eight weeks. To cure 100 per cent would require three or four months of continuous treatment. Since there is no way of determining who will require a short period of treatment and who will require longer and still longer periods, if we should require to cure 100 per cent we should have to give all treatment for a period of three or four months. There is no method by which we can examine a patient under treatment and be sure that he has been cured of this infection. Between the two extremes of curing 100 per cent on the one hand and too few from a shorter period of treatment on the other, I personally feel that it is better to strike a happy middle ground in which the treatment given cures a satisfactorily large per cent of cases, but longer periods of unnecessary treatment are avoided. Personally I feel that eight weeks is the proper length of treatment for all ordinary purposes. An occasional case will be found that will not be cured of his infection by this treatment. Such individuals, if we could know them in advance, could be given a longer period of treatment at first. They are usually cases which give histories of previous attacks and failures of shorter periods of treatment. Such patients probably should be given at the outset a longer treatment than the eight weeks' period.

Intravenous Administration of Quinine.—The only cases in which quinine should be given intravenously are those in which it is believed that the patient's life is in danger and might be saved by getting quinine into the blood stream at once, whereas it would be dangerous to wait for the effect of quinine given by mouth.

Quinine is much more effective when given by mouth than when given in any other way, but it takes some two to four hours or more to get the maximum effect when given in this way. Five to seven and a half grains of the dihydrochloride in 20 cc or more of water is the proper form in which to give quinine intravenously. The dose may be repeated in two or three hours if necessary, but should not be allowed at any time to take the place of quinine by mouth when it can be given in this way. Quinine given intravenously is not a proper method of treating ordinary cases of malaria.

Intramuscular Administration of Quinine.—There is practically no place in the treatment of malaria for intramuscular administration of quinine. It is much slower and far less dependable than when given by mouth. Besides this, more or less damage is frequently done, and in many instances necrosis and abscesses are produced. The same amount of quinine sulphate given by mouth is usually quicker in its action and much more effective. One who gives quinine intramuscularly and neglects to give it by mouth actually endangers the life of his patient, by omission, rather than safeguards it.

By W. M. James, M.D.

The proper method of treatment of malarial infections seems to be a subject of never-ending discussion, and the fact that so many methods are advocated speaks eloquently for our failure to find one generally agreed upon. I am very pleased to write you of my own personal experience.

In a recent monograph, "Notes on the Treatment of Malaria with the Alkaloids of Cinchona," by Wm. Fletcher, M.D., which is reviewed by Dr. Lewis B. Bates in the March number of the *American Journal of Tropical Medicine*, are some exceedingly interesting points in the treatment of malaria. I read this monograph at Dr. Bates's request and agreed entirely with him in his review. I do not think that a review of the recent literature on the various treatments of malaria is of any practical importance. I agree with Dr. Fletcher and the Editor of the *Indian Medical Gazette* that there are few, if any, cases of chronic malaria which cannot be cured under personal observation.

I left the employ of the Panama Canal eight years ago, and, except for my service in the army during the war, have been in private practice in Panama ever since. I am thoroughly convinced that very much better data can be obtained by close observation of a few cases than by the reports and observations of a few men on many thousands of cases of malaria.

Twelve years ago I thought I knew all there was to know about the treatment of malaria, because I based my opinion on my observations of many thousands of cases in Ancon Hospital. I learned later that there was a good deal I did not know.

One of the most important things is to be sure that the patient is taking quinine in the doses indicated by the treatment.

In my private practice I do not treat many cases, as malaria in Panama and the Canal Zone is now a relatively infrequent disease. But I have found that in a very large proportion of my private cases, which relapsed three or four times, the patients were not taking the quinine at all, or else in the form of capsules and powders. These cases, just as those of Dr. Fletcher, cleared up when we saw to it that the quinine was being taken as directed.

I consider these observations, and the similar ones of Dr. Fletcher, of vastly more importance in the treatment of chronic relapsing malaria than all that I made while I was in Ancon Hospital. It is surprising to encounter the subterfuges of the patients in dodging the taking of quinine.

It is true that under any method of treatment, a certain number of cases will relapse, but like Dr. Fletcher I have not found any which I could not cure in time, provided they took the quinine.

In recent years I have not given quinine over a long period in diminishing doses as I did formerly. The methods which should be employed in those cases which have taken quinine as a prophylactic over a long period

of time are the same, in my opinion, as those to be used in treating the acute attacks. It is undoubtedly true that some parasites become quinine fast, and if they do so after a thorough treatment the patient will surely relapse, but I believe that they lose this immunity to a very large extent during the period of relapse, and the later the relapse, the less the immunity.

I have been impressed with the fact that observations covering the treatment of large numbers of patients are not as valuable as those made by competent observers on a small number of cases, when these are personally followed with a sure knowledge of the details of treatment. It is no therapeutic labor to stop the ordinary acute case of malaria; from this point the following of the case should be a matter of direct personal observation if proper data are to be obtained. In my own practice my percentage of relapses is small, and I attribute this to the pains which I take to see that liquid quinine is properly taken.

There are distinct indications for the intravenous,, intramuscular and oral administration of quinine, and each of these has a very definite place in therapy. A point well worth considering in this respect is the fact that quinine given intravenously, and in all probability intramuscularly as well, goes directly to all of the organs and tissues of the body, while that given by mouth passes through the portal system and has to go through the gastrointestinal tract, and also the liver, before it reaches all the parts of the body where the parasites are frequently found. What goes on in the peripheral circulation is no sure indication of what is taking place in the internal tissues and organs, and it is surprising to see the different localizations of the parasites that autopsy reveals in acute malaria.

I have nothing revolutionary nor anything particularly new to offer. All that I can give you is the result of my own personal experience. This will probably be controverted, but at least I know what I am writing about.

Relapsing malaria is costing the United Fruit Company so much money that Dr. Deeks, who is medical superintendent, has decided to call a consultation and get the best advice he can.

Dr. Deeks knows as much about the treatment of malaria on a large scale as any one else, and he has very successfully treated cases referred to him which have not responded to treatment by other physicians. I think his opinion is the same as mine. Get enough quinine into the patient at the proper time and there will not be many relapses.

* * *

The following answers were received from those who replied in detail to the questionnaire:

(1) *In the treatment of acute malarial infection do you give a few large doses or moderate ones over a long period of time?*

Dr. C. C. Bass, New Orleans: Practically all cases are given the Standard treatment, which is: "For the acute attack 10 grains of quinine sulphate by mouth three times a day for a period of at least three or four days, to be followed by 10 grains every night before retiring for a period of eight weeks. For infected persons not having acute symptoms at the time only the eight weeks' treatment is required."

Dr. James B. Guthrie, New Orleans: I am now using the large dosage exclusively; 30 grains at least daily for three days in 10-grain doses t.i.d.; then 10 grains daily for sixty days at least. This obviates "quinine immunity" for the plasmodia.

Dr. G. C. McKinney, Lake Charles, La.: Large doses, 10 to 15 grains every three hours to 60 grains in twenty-four hours. This must be so timed that the maximum effect is present at the time of the next expected paroxysm. Temporizing with small doses may, and does, sometimes result fatally. The conclusion arrived at by laboratory workers that 30 grains of quinine in twenty-four hours is sufficient to control malaria is a fallacy. It may be, but frequently is not. There is no harm in 40 to 60 grains per day. In fact the effect on the patient is not as bad as 20 to 30. The smaller amount causes irritation, the larger

amount produces a sedative effect which is not unpleasant. During 1909-10 I had the opportunity of seeing a great number of malaria cases treated in institutions by men of great experience. Like others of theoretical knowledge I believed large doses were dangerous. One physician ordered 40 grains in mild cases at the beginning. Repeatedly I saw this fail to stop the paroxysm. I never saw the raising to 60 grains fail. I never saw bad results from sixty. The average case may not require 60 grains per twenty-four hours, but it is safer to give it.

I regard the giving of 20 to 30 grains of quinine per day in malaria about the same as ⅛ grain of morphine in a severe attack of renal colic. Nothing can be expected from either.

Dr. John Schreiber, Monroe, La.: Have not practiced medicine actively in past eight years. All my time is given to county public health administration. In our educational work my office is recommending "The Standard Malarial Treatment" of 30 grains daily until active phase is over, and then 10 grains daily for sixty days to eliminate the parasites.

Dr. Henry L. Green, Shreveport, La.: Five or six grains every third hour of quinine hydrochloride by mouth. To 40 grains within twenty-four hours.

Dr. Henry Rose Carter, Jr., Birmingham, Ala.: I have been using the method recommended by the National Malarial Committee. Achton in India appears to me to have shown that the human host cannot be sterilized of the plasmodium malariæ by large doses alone, but the treatment must be continued over a long period of time.

Dr. C. H. Mastin, Mobile, Ala.: Moderate doses, viz.: Three to five grains every 3½ to 4 hours, and ten grains 2½ hours before the expected paroxysm.

Dr. J. M. Anderson, Columbia, Ga.: Small doses followed by smaller ones for long period.

Dr. Fred L. Webb, Macon, Ga.: I give a 20-grain dose at bedtime after paroxysm. Repeat 20 grains daily, either in divided doses or at bedtime, until 100 grains are taken. Then 10 grains, or 5 grains, daily up to a total of 200 grains.

Dr. G. M. Guiteras, Galveston, Texas: 0.30-centigramme doses every three or four hours day and night until fever is under control. Then 0.30 centigramme q.i.d., later on reduced to 0.30 centigramme t.i.d and 0.30 bis in die for about a month. When the hour of the paroxysm is known a double dose, or 0.60, is given one hour before the expected time.

With reference to malaria it might be interesting to state that malaria does not occur in Key West, Florida, or Galveston, Texas, for the reason that no anopheles exist at either place. What few cases come under observation are introduced from the interior.

(2) *In severe acute infections, do you ever give it intravenously, and if so in what dose? Do you use a concentrated or dilute solution, and what salt of quinine do you employ?*

Dr. C. C. Bass: Yes, in very rare instances of comatose malaria or where there is reason to believe that the life of the patient would be endangered by waiting for the effect of quinine by mouth. Dose of quinine dihydrochloride ⅓ to ½ gramme in 20 cc or more of water.

Dr. James B. Guthrie: In acute cases with so-called "pernicious phases" intravenous quinine is indicated. The dihydrochloride I should prefer, and in 20-grain dosage, well diluted in salt solution, or very slowly administered if not diluted.

Dr. G. C. McKinney: It is not necessary. The above method (see No. 1) always gets results. If it should be vomited, give salol-coated capsules with acid drink. Salol is dissolved in stomach unless given with acid. If this should fail, intravenous injection must be resorted to. It does not matter about the salt so long as it is adapted to intravenous use.

Dr. Henry L. Green: To date I have not thought intravenous quinine indicated.

Dr. Henry Rose Carter:. Intravenous quinine is definitely indicated in severe in-

fections. Since being in Birmingham I have not seen any cases in which it was needed. The dilute solution is safer. These opinions are based on experience with malaria in the Canal Zone.

DR. C. H. MASTIN: Have *not* used the drug intravenously.

DR. J. M. ANDERSON: No, never.

DR. FRED L. WEBB: Yes, quinine hydrochloride seven and a half grains in 2- or 5-cc solution ampoules.

DR. G. M. GUITERAS: Yes, in doses of .10 and .20 centigramme, using hydrochloride of urea and quinine.

(3) *Do you use it intramuscularly under any circumstances?*

DR. C. C. BASS: Absolutely no.

DR. JAMES B. GUTHRIE: No! No! No!

DR. G. C. MCKINNEY: No.

DR. HENRY L. GREEN: No.

DR. HENRY ROSE CARTER: Yes. Certain cases do not respond to the oral administration of quinine, and at times intramuscular injections clear them of infections.

DR. C. H. MASTIN: No.

DR. J. M. ANDERSON: No.

DR. FRED L. WEBB: Never do.

DR. G. M. GUITERAS: Yes, when no other means of administration are available.

(4) *Do you regard quinine as a harmful or useful drug in the presence of malarial hematuria or hemoglobinuria.*

DR. C. C. BASS: Quinine tends to increase hemoglobinuria when it is present or in otherwise susceptible individuals. It therefore tends to make the hemoglobinuria worse, but it is the only remedy available for malaria. It should be given sparingly during the attack of hemoglobinuria, and then only when malaria plasmodia are numerous. After the hemoglobinuria is past, thorough quinine treatment should be given to cure the infection.

DR. JAMES B. GUTHRIE: In the presence of plasmodia in circulating blood I would give quinine. We see in New Orleans very little of malarial hematuria.

DR. G. C. MCKINNEY: No. Malaria is the cause of hematuria or hemoglobinura. Quinine is the only salvation. Neither will it cause abortion in pregnancy. Malaria causes the abortion.

DR. HENRY L. GREEN: Useful without the various fever powders.

DR. HENRY ROSE CARTER: Following the method of Dr. W. E. Deeks, we gave quinine in these conditions if the patient had plasmodium malariæ in his blood smear. When the blood was negative we discontinued the quinine, but after the hemoglobinuria cleared up the patient was treated with quinine before discharge.

DR. C. H. MASTIN: Not contraindicated by the hematuria, but is indicated for the supposed cause.

DR. J. M. ANDERSON: No.

DR. FRED L. WEBB: I stop quinine if blood appears in urine.

DR. G. M. GUITERAS: Harmful.

(5) *Have you ever seen quinine produce hematuria or hemoglobinuria?*

DR. C. C. BASS: No.

DR. JAMES B. GUTHRIE: No.

DR. G. C. MCKINNEY: No. Such conclusions are jumped to merely because quinine was being given.

DR. HENRY L. GREEN: I do not know. I think I have.

DR. HENRY ROSE CARTER: Yes, but only in malarial patients.

DR. C. H. MASTIN: No.

DR. J. M. ANDERSON: No.

DR. FRED L. WEBB: Yes.

DR. G. M. GUITERAS: No.

(6) *Is hematuria or hemoglobinuria a frequent complication in malarial disease in your locality?*

DR. C. C. BASS: No. Very seldom seen; quite a negligible quantity.

DR. JAMES B. GUTHRIE: (See answer to No. 4.) The men in the Yazoo delta and other parts of the country see malaria of this type.

DR. G. C. MCKINNEY: Not now. Malaria is almost a forgotten disease here now.

DR. HENRY L. GREEN: Not in my practice.

DR. HENRY ROSE CARTER: No. In this section of Alabama malaria is not a prevalent disease, there being 302 cases reported for 1923 in Birmingham and Jefferson county with a population of 310,000.

DR. C. H. MASTIN: No.

DR. J. M. ANDERSON: No.

DR. FRED L. WEBB: No—rare.

DR. G. M. GUITERAS: No, neither in the vicinity of Key West, Florida, or Galveston, Texas.

(7) *In the presence of hematuria, do you use sodium thiosulphate?*

DR. C. C. BASS: No. Do not believe it has any value.

DR. JAMES B. GUTHRIE: My own experience is insufficient upon which to base any worth-while conclusions on this point.

DR. G. C. MCKINNEY: No. It is good for fixing photographic films. There is no logical reasoning for the administration of such a chemical in malaria—pure empiricism.

DR. HENRY L. GREEN: I have not used sodium thiosulphate.

DR. HENRY ROSE CARTER: I have never used this drug in this condition.

DR. C. H. MASTIN: Have not, but have given chloride of iron.

DR. J. M. ANDERSON: No.

DR. FRED L. WEBB: No.

DR. G. M. GUITERAS: Have not used it.

Heliotherapy in the Treatment of Tuberculosis[1]

BY HORACE LoGRASSO, M.D.
J. N. Adam Memorial Hospital, Perrysburg, New York

The conception of the sun as the source of light and heat, and therefore of life, has been present in the mind of man from the very beginning. Even the primitive brain could grasp the significance of the sickly pallor of grass growing under stones and prisoners confined in sunless caves or dungeons. From this idea it was but a step further to conceive that the sun's rays might have virtue, not only in promoting life and well-being, but in actively combating disease and repairing its ravages. Here, however, the matter entered into the realm of science, and its consistent development had to await the growth of scientific knowledge.

The medical literature of the past records various instances of what may be considered as applications of heliotherapy; and if complete histories of therapeutics in all the countries of the world could be obtained, one ventures to assume that each one would afford examples of the use of sun treatment, more or less empiric, according to the degree of enlightenment of the user. For many centuries, however, these instances seem to have been detached and unrelated. No attempt seems to have been made to use previous successes and failures as a means of arriving at a more comprehensive knowledge of the sun's action or a systematic method of application, until the closing years of the nineteenth century, when the work of the French school of heliotherapists brought the subject into the prominence it deserved, from which it has not receded up to the present time. Sun-cure was tried at the seashore and at various altitudes, and in a variety of diseases; observations were made and reported, pointing toward conclusions to be used in subsequent efforts.

Foremost among these pioneers in the field stands Dr. Rollier, who is justly regarded as the father of heliotherapy, although due credit must be accorded Bernhardt of Samadan, to Poncet, Bonnet, and others. At the outset of his career, Rollier, like many another ambitious young physi-

[1]Read before the California Tuberculosis Association, at Los Angeles, Calif.

cian, chose surgery as his specialty, acting as assistant to the famous and skilful surgeon, Professor Kocher. He became especially interested in operations for extra-pulmonary tuberculosis and noticed the deplorable lack of success attending these, in spite of the great care and skill exercised. Deformities, non-healing wounds and lowered vitality seemed to be the final outcome. He concluded that extra-pulmonary tuberculosis was a constitutional disease and hence could not be successfully dealt with as long as treatment was confined to the localized lesions by which the general disease was manifested. He did not content himself with skirmishes at the outposts but attacked the very stronghold of the disease. With these principles in mind, Rollier, in 1903, founded his first sun-cure clinic in Leysin, Switzerland, for the treatment of extra-pulmonary tuberculosis. He worked out a system for the application of solar energy that proved so satisfactory that it has been adopted, with or without modifications, in practically every place where heliotherapy is extensively practiced.

Unfortunately, Rollier's adoption of heliotherapy did not cause an immediate revolution in the treatment of extra-pulmonary tuberculosis. His method lacked the spectacular novelty that so often causes new serum or a new trick in surgery to be taken up with such rabid enthusiasm by the medical profession. The fact that all forms of tuberculosis other than pulmonary were termed without question "surgical tuberculosis" shows plainly enough how deep-rooted was the idea that surgery was the correct procedure in this form of disease. Surgery was thorough and exact; it promised a quick turnover of patients; it seemed so admirable in many ways that the physician was overwilling to be persuaded that it was also efficacious. The fly in the pot of ointment was that the facts did not bear out the truth of this supposition. The thoroughness was only apparent; the primary foci of the disease eluded the surgeon's knife.

Another drawback to the acceptance of heliotherapy was its deceptive appearance of simplicity, which led many physicians to give it a casual trial without first thoroughly acquainting themselves with the proper methods of application. The indifferent or even harmful results obtained in this way usually led to the abandonment and the indiscriminate condemnation of this form of treatment. Heliotherapy *is* simple inasmuch as it makes use of an agent with which we are all familiar and which is obtainable "without money and without price"; but, on the other hand, solar energy is too powerful a force to be employed without basing one's methods on knowledge and experience.

In spite of prejudices and drawbacks, however, the leaven has done its work and light energy has come to be accepted as one of the most effective agents at the command of the modern therapeutist and clinician. Gauvain in England, Calvé in France, and Reidel in Germany were among the first in their respective countries to follow Rollier's conservative mode, while in America Dr. John H. Pryor vigorously promulgated the doctrine of heliotherapy. It was introduced in Buffalo's tuberculosis hospital at Perrysburg in 1913, and before long the work assumed an extent and importance that must have been very gratifying to its doughty sponsor in the closing days of his career.

In considering the practical side of the matter, one of the first questions arising is, "In what countries or regions may sun treatment be given?" If financial circumstances and the drain on vitality incident upon lengthy journeys were negligible factors, one would unhesitatingly choose those parts of the world where the sun shines every day, where the temperature is neither uncomfortably high nor uncomfortably low, and where the humidity is never excessive. Since these above considerations, however, far from being negligible, are always to be reckoned with, one must choose a locality that comes as near as possible to the ideal and is at the same time within reach of the patient and his pocketbook. It is indeed wiser to give him the benefit of the sun that can be had near at hand than to let him die

while devising ways and means to get him to a climate where the sun conditions are ideal. It is encouraging to note that even in the changeable and uncertain climate of the northeastern quarter of the U. S. A. we have an abundance of places where enough sun can be had throughout the year to be of inestimable value.

While it is undoubtedly true that a moderately high altitude offers advantages to heliotherapy, most brilliant results are being obtained at the seashore and at low altitudes further inland. It is principally to the bracing character of the mountain air, due to its lower temperature and action of its moving air, that the advantage of high altitudes must be attributed. During the summer months the heat in lowlands, especially where the humidity is high, is oftentimes very depressing, and for this reason it is strongly advised that during this season of the year we carry out heliotherapy in the early mornings and the late afternoons.

The uncertainties of weather and climate, together with the demand for a form of treatment that would not require city-dwelling patients to leave their homes, have led to much experimentation with artificial sources of light energy in the hope of discovering a satisfactory substitute for sunlight. This brought up the question as to whether all the rays of the solar spectrum are of equal therapeutic value. Many are inclined to attribute the greatest healing power to the ultra-violet rays. Personally, I am of the opinion that whatever results are obtained by sun treatment must be attributed to the action of the entire spectrum and not to the action of any particular ray. The results obtained by the use of the mercury arc lamps, which are very rich in ultra-violet ray, certainly do not compare with those obtained by the sun. The present tendency seems to be to choose a light having a spectrum closely resembling that of sunlight. The carbon arc lamp seems to fill this requirement better than any other type, and has been used with marked success at the Finsen Institute at Copenhagen. But even the best lamps obtainable have proven inferior to natural sunlight, and their employment is advised only when heliotherapy is interrupted by seasonal or weather conditions. We must remember that sun-cure is a combination of sun and air treatment, and that when artificial radiant energy is being employed a patient is usually exposed in a room where the air is vitiated and is therefore deprived of the moving, fresh air, which is part of sun-cure. Patients treated with artificial light do not show the same tan and velvety skin, nor the same tone in the musculature, as we get with natural sunlight. This tone in musculature may be due to the action of moving air on the musculature in general.

Whether the action of radiant energy upon disease is specific or merely indirect is an interesting point that cannot be settled until our knowledge is more complete. Some have tried to trace a connection between the bactericidal power of light and its therapeutic value, but it seems extremely improbable, and certainly has not been proved, that bacilli in the living body would be affected in the same way as those directly exposed to light. We have reason to believe that it does not cure through its bactericidal effect as evidenced by the results in diseases which are not due to micro-organisms, such as rickets, anemia, etc.

As has been previously intimated, the success of sun treatment depends to a very great extent upon the method of its application. Although it can be applied in the patient's home, the ideal place is a hospital or sanitarium where his case can be under constant observation and where he has the example and companionship of others who are living under the same regimen. Bearing in mind that tuberculosis is a constitutional disease, we see that the whole body should be exposed to the sun. To expose only the local lesions is to be guilty of the same error as those who relied on surgery. Then, too, the sun's action must be supplemented by fresh air, rest, nourishing yet easily digested food, and surroundings inducive to contentment, which have been recognized from the time of Hippocrates and Galen as invaluable in the treatment of pulmonary tuberculosis, and which we now

see are just as indispensable in the other manifestations of the disease. In this connection the limitations of artificial light treatment, even with the most perfect lamps, become clearly apparent, since it is almost impossible to duplicate those supplementary factors that contribute so largely to the success of heliotherapy.

Another important point is the necessity for immobilization in cases of bone and joint tuberculosis. With young children, strapping to the bed is sometimes found necessary; with adults, an explanation from the physician is usually sufficient to bring about the hearty coöperation of the patient. Since casts would cut off the sun's rays from a part of the body, their use is avoided and fixation is provided by other means. As long as the disease shows the least sign of activity, the patient is required to rest on a hard bed while the diseased part is kept in the desired position by means of traction and hard pillows. This method has been found much superior to the use of casts. By giving free access to the sun and allowing gentle motion within the limit of pain, the function of the joints and tone of the musculature are wonderfully preserved and atrophy and ankylosis are prevented in a large majority of cases.

The practice of exposing either the whole or a part of the patient's body for a long period of time from the very first day of sun treatment has been responsible for many of the alleged failures of this form of therapy. A gradual progression in insolation is absolutely essential. The habit of wearing clothing from earliest infancy has created for civilized humans an artificial environment from which they cannot be suddenly and completely removed without risk. Even with a healthy individual this could hardly be done with impunity, and the danger, with the consequent need for caution, increases proportionately with the lowered vitality of the patient. Hence we see that no hard and fast rules can be set but that each case must be treated individually, the chief determining factors being the patient's physical condition and the state of the weather.

Before irradiation is commenced the patient goes through a period (in some cases very short, in others rather lengthy) of inurement to open-air living. Beginning in a room with doors and windows open he progresses with ever-lengthening sessions on the porch, until he can comfortably spend twenty-four hours of the day in the

On entrance. 2 years later.
Case No. 3414.—T. F. hand and wrist.

open. During this period the physician has an opportunity to make a careful study of the clinical and laboratory findings, as well as to make bedside observations from which he can determine when and with what rapidity the patient may proceed with sun exposures. After these are begun a vigilant watch must be kept for unfavorable reactions, such as fever, rapid pulse, nausea, headache, heat-stroke, or erythema, and the insolation schedule adjusted accordingly. If, owing to such reactions or unfavorable weather conditions, irradiations are omitted for a time, when resumed they should be of shorter duration than at the time of interruption, in case the patient may have lost some of his sun tolerance.

This matter of sun tolerance has a direct

relation to tanning and seems to be partly racial. Brunettes possess it to a greater degree, or acquire it more readily, than blondes, while the red-haired type is extremely difficult to bring to the point where a beneficial amount of sun can be given.

Exposures are made with the patient in the recumbent position, the head being pro-

Local condition on entrance.

Case No. 3414. 2 years later.

X-ray on entrance.

Case No. 3414. 2 years later.

tected by cap or umbrella and the eyes shielded by means of colored glasses or a folded towel. An oil rub at the close of the insolation period adds to the patient's comfort and improves the condition of the skin.

The time of day selected for irradiations

On entrance.
Case No. 3766.—T. B. peritonitis (with fecal fistula.)

depends on the season of the year. During the hot weather the earlier and later parts of the day should be chosen, as the heat of noonday is likely to prove depressing, especially to those with marked cachexia and fever. In cooler seasons the exposures should be given during the warmer part of the day so as to insure greater comfort for the patient. Care must be taken, however, not to have the insolations come too near to meal hours.

During the cold seasons of the year breezes striking the body during irradiation are both disagreeable and dangerous. The site for a sun-cure institution must be chosen with due regard for wind protection, and such winds as reach the sun-cure porches, in spite of the favorable location and construction of the building, should be cut off by means of adequate screens.

Air baths given on days when there is no sun tend to stimulate the skin and muscles, improve the appetite, and keep the patient inured to exposure. Here again the determining factors as to the duration of the baths are the weather and the physical condition of the patient. Wind protection, too, is just as important as when giving sun baths. In winter, hardy, well tanned patients may be exposed as long as fifteen minutes at a time without ill effects. Children have been allowed to play in the snow for an hour at a time wearing only shoes and trunks. In milder weather they are encouraged to go without clothing throughout the entire day. Where privacy can be had, adults are advised to follow the example of the children.

It is safe to say that most of those who have tried heliotherapy, and then condemned it as worthless or harmful, have violated one or more of the rules and principles that should be followed. Any one who takes Rollier's directions and interprets them with plenty of common sense cannot go far astray.

Rollier chooses to begin insolation with a five-minute exposure of the feet. This is not an arbitrary choice but one based on the idea that since this part of the body is most remote from the vital organs, its exposure is least likely to produce a shock. The rest of the body is exposed in the following order: the legs from ankle to knee, the thighs, the abdomen, and lastly, the chest. Open lesions are not uncovered to the sun until after all the rest of the body has been insolated. When the dressings are removed, they are replaced by a wire

21 months later.
Case No. 3766.

screen to keep off the flies and allow free insolation of the part.

The following is a detailed description of Rollier's technique, with a few modifications:

First day: The patient, reclining on a bed and dressed only in trunks and with head and eyes protected, is taken to the sunporch. His body is covered with sheets or blankets down to the feet, which are exposed and insolated for periods of five minutes, three times during the day with intervals of about an hour.

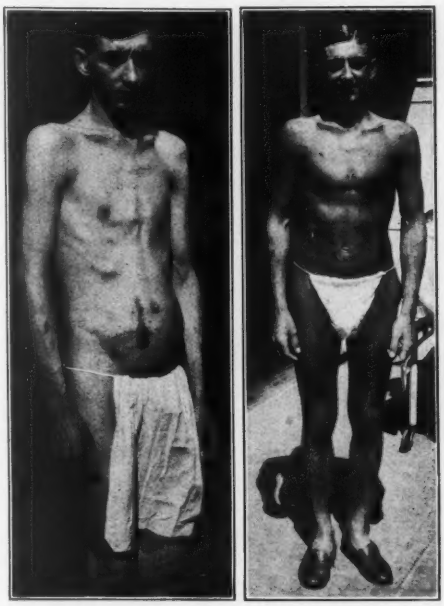
Second day: Each insolation period of the feet is increased to ten minutes, and during the last five minutes of each period the sheets are drawn back to the knees, thus giving the legs from ankle to knee three five-minute exposures.

Third day: The feet are irradiated for fifteen minutes at each period. The insolation time of the part from ankles to knees is increased to ten minutes, and during the last five minutes the thighs are exposed and insolated.

Fourth day: Each of the three insolation periods is as follows: feet, 20 minutes; ankles to knees, 15 minutes; thighs, 10 minutes; abdomen, 5 minutes.

Fifth day: Each insolation period of each part previously irradiated is increased by five minutes, and the chest receives its initial exposure of five minutes each period.

This daily increase in the length of the irradiation periods is kept up until on the twelfth day the longest-exposed part receives a total of three hours, the exposure periods being, for the feet, 60 minutes; ankles to knees, 55 minutes; thighs, 50 minutes; abdomen, 45 minutes; and chest, 40 minutes. From this day on to the sixteenth, the insolation period of the feet remains 60 minutes, while that of the other parts keeps increasing at the same rate until the 60-minute limit is reached by each one in turn. On the seventeenth day the change is made from three 60-minute periods to two 90-minute periods, one in the morning and another in the afternoon. If this length of insolation is contraindicated because of poor general condition, fever, very sensitive skin, etc., the time may be shortened. On the other hand, if the indications warrant it may be increased to four hours by slow progression. The anterior and posterior surfaces should, if possible, receive the same amount of radiation, the total exposure being divided equally between the two surfaces. In certain instances where the patient, either because of pain or general physical condition, cannot be turned to permit irradiation of the posterior surface, the anterior surface alone is insolated until improvement in the physical condition will permit the turning of the body, when the procedure outlined above is repeated.



On entrance. 1 year later.

Case No. 2909.—T. B. peritonitis (with sinus).

The favorable progress of the cure seems to be in direct proportion to the intensity of the pigmentation. When the patient is responding well, in a short time the skin begins to take on a bronze hue, then a copper color, and finally a beautiful chocolate brown. It becomes supple and velvety, and free from blemishes. Its resistance to local infections is markedly increased.

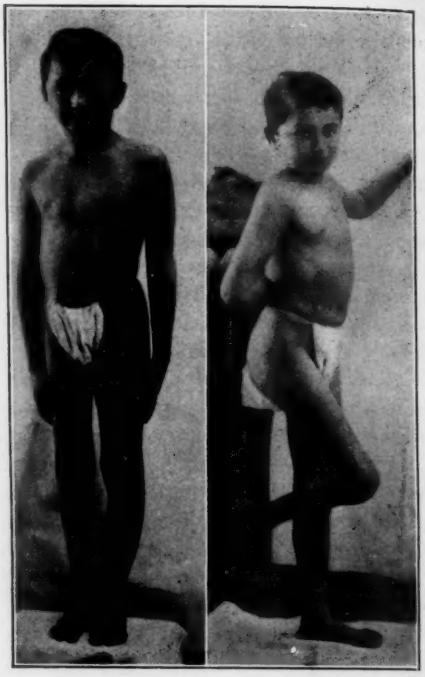
One of the most striking effects of light treatment is to be observed in the muscula-

ture, which, in spite of the patient's enforced inactivity, becomes hard and firm and normal in contour, so that he presents the appearance of an athlete. The prompt and rapid change in the general condition is very gratifying. The features lose the droop of dejection and become animated with hope and cheerfulness. There is a rapid alleviation of pain, followed, usually, by its complete cessation; fever subsides; appetite returns; weight and strength are taken on; and the blood condition improves. Both hemoglobin and red cells increase, and leucocytosis, if present, becomes reduced and an actual lymphocytosis takes place.

On entrance.

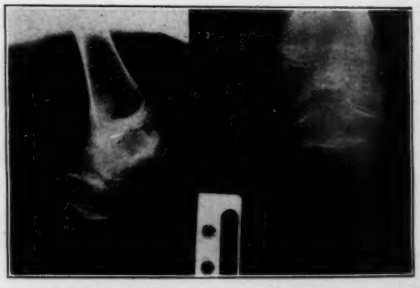
Case No. 3300.—T. B. knee with flexion deformity and subluxation.

The action of the sun upon tuberculous tissue is one of repair. It appears to increase the rate of disintegration of cells damaged beyond repair while stimulating the activity of those which are undamaged. This is shown by an increase, at first, in the amount of ex-

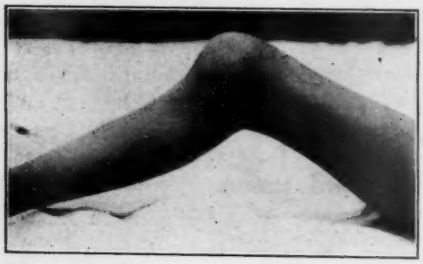


2 years and 3 months later showing nutritional change. Showing motion.

Case No. 3300.



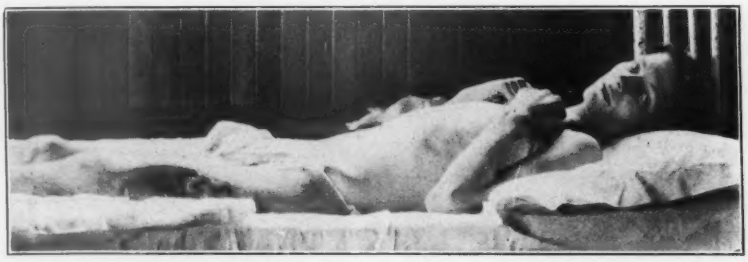
Case No. 3300.—X-ray on entrance.



Case No. 3300.—Showing flexion deformity.

Case No. 3300.—X-ray 2 years an l 3 months later.

udate from sinuses and ulcers, accompanied frequently with swelling, edema and induration of the surrounding parts. This is followed by the subsidence of the swelling, the gradual diminution of exudate, the formation of healthy granulation tissue, and a subsequent healing of sinuses, or ulcers. The effect on effusions is one of absorption. This is best observed in peritonitis and pleurisy.



On entrance.
Case No. 4189.—Osteomyelitis of left femur with pathological fracture.

Case No. 4189.—Local lesion on entrance.

Case No. 4189.—Local lesion 15 months later.

X-ray on entrance. X-ray 15 months later.
Case No. 4189.

Abscesses are usually absorbed or become calcified. They often continue to increase in size during the first month or two, during which time they are repeatedly aspirated if their tension threatens spontaneous opening. In case the pus is too thick for aspiration, a small incision under rigid asepsis is indicated in an effort to prevent the formation of a sinus.

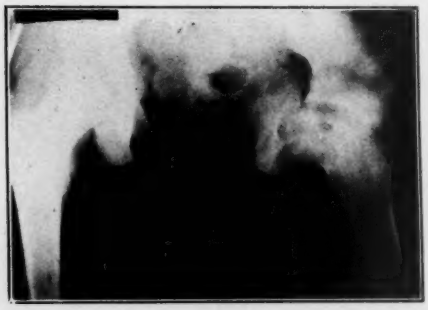
The effect of the sun upon bone tissue is one of increased repair with intense recalcification.

The outstanding local result in those cases of joint tuberculosis that are not too far advanced is the gradual restoration of function, partial or complete, whereas

15 months later.
Case No. 4189.

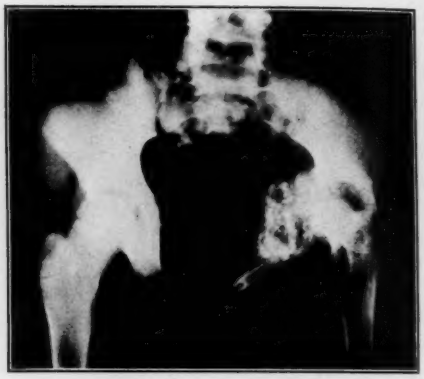
with the classical method of treatment by casts or operative procedure, complete ankylosis is the desired result.

While the change from purely surgical measures to the more conservative treatment prescribed by Rollier was a change in the right direction, we would not go so far as to say that surgery is never indicated in extra-pulmonary tuberculosis. In any case no surgical interference should be resorted to unless the sun fails. We have observed many instances where a few months of sun-cure have changed the whole aspect of cases which at first had appeared hopeless. It is well that if operative procedure is resorted to, it is preceded and followed by sun-cure.



On entrance. Showing abscess shadow extending through acetabulum into pelvis.

Case No. 3024.—T. B. left hip.



Case No. 3024 —3½ years later showing calcification of abscess and regeneration of bone.

In dealing with bone and joint cases the services of an orthopedist are invaluable. With his knowledge of orthopedic appliances he can accomplish a great deal in preventing and correcting deformities. His true field in tuberculosis is further found in the correction, by operative procedure, of deformities and faulty articulation that could not be prevented through too long delay in commencing the treatment, or any other cause.

Up to January 1, 1925, 935 patients presenting extra-pulmonary lesions have been discharged from the J. N. Adam Memorial Hospital at Perrysburg; 433, or 46 per cent, were cases of tuberculous adenitis of lymph nodes; 102, or 10 per cent, cases of tuberculous peritonitis; 34, or 3½ per cent, tuberculosis of the kidney; 290, or 31 per cent, were cases of bone and joint tuberculosis; and 26, or 3 per cent, were osteomyelitis. This number includes only those

Case No. 3024.—3½ years after entrance. Showing amount of motion. Boy walks without crutch or cane.

who remained in the sanitarium three months or longer.

Seventy per cent of these were discharged as apparently recovered, 17 per cent as arrested, 7 per cent as improved, 4 per cent unimproved, and 2 per cent dead.

Case No. 3007.—On entrance. Showing paravertebral shadow.

Case No. 3007.—3 years later.

To the above may be added 49 cases of pyopneumothorax and 98 cases of pleurisy with effusion complicating pulmonary tuberculosis, which received heliotherapy with exceptionally good results.

No case that has been a bed patient is discharged as apparently recovered unless he has been up and about for at least three to six months. He is not allowed, as a rule, to be up and about until the *x*-ray shows good repair and all signs and symptoms have disappeared, and sinuses and ulcers are healed and abscesses absorbed or calcified.

A large number of cases, after they have been up for a month or two, become very restless and leave the institution before the three to six months' probation period is up, and as a result our percentatge of apparent recoveries is reduced.

Of the number that died, the cause of death of three was influenza during the epidemic, while in one case a psoas abscess ruptured into the intestines, causing death in a few days. The remainder were cases of several years' standing with advanced pulmonary tuberculosis.

Fourteen per cent of the adults and 21

On entrance. 3 years later.

Case No. 3007.—T. B. spine (5th and 6th thoracic and 1st and 2d lumbar).

per cent of the children discharged had a multiple lesion.

Fifty per cent of the adults and 27 per cent of the children had had surgical interference.

Seventy-six per cent of all the joint cases were discharged with partial or full motion.

Sixty-nine per cent of the adults and 16 per cent of the children had a diagnosable pulmonary lesion.

J. N. ADAM MEMORIAL HOSPITAL

Name

No.

Date																								
Days		1st	2nd	3rd	4th	5th	6th	7th	8th	9th	10th	11th	12th	13th	14th	15th	16th	17th						
		T.I.D	T.I.D	T.I.D	T.I.D	T.I.D	T.I.D	T.I.D	T.I.D	T.I.D	T.I.D	T.I.D	T.I.D	T.I.D	T.I.D	T.I.D	T.I.D	B.I.D.						
																		The amount of exposure, from this day on, is the same except that the periods are divided into a morning and an afternoon period of 90 min. each.						
		5 Min.	5 Min.	5 Min.	5 Min.	5 Min.	10 Min.	15 Min.	20 Min.	25 Min.	30 Min.	35 Min	40 Min	45 Min.	50 Min.	55 Min.	60 Min.	60 Min.	8:45						
Total Daily Exposure of part exposed longest		15 Min.	30 Min.	45 Min.	60 Min.	75 Min.	90 Min.	105 Min.	120 Min.	150 Min.	150 Min.	165 Min.	180 Min.	180 Min.	180 Min.	180 Min.	180 Min.							
THESE EXPOSURES ARE TO BE DIVIDED EQUALLY FOR ANTERIOR AND POSTERIOR SURFACES WHENEVER POSSIBLE																								
Time for the above Exposures	A.M.	8:45	8:45	8:45	8:45	8:45	8:45	8:45	8:45	8:45	8:45	8:45	8:45	8:45	8:45	8:45	8:45	8:45	8:45					
	A.M.	9:50	9:55	10:00	10:05	10:10	10:15	10:20	10:25	10:30	10:35	10:40	10:45	10:45	10:45	10:45	10:45							
	P.M.	3:15	3:15	3:15	3:15	3:15	3:15	3:15	3:15	3:15	3:15	3:15	3:15	3:15	3:15	3:15	3:15	3:15						

MODIFICATION OF ROLLIER'S SCHEMATIC DIAGRAM OF INSOLATION

The average duration of illness before admission was 2½ years.

In more recent years solar energy has been attaining wide recognition as an effective agent in the treatment of rachitis in children, and anemias. In fact, it is invaluable in all diseases arising from a lowering of the general physical condition, and is an undoubted aid in shortening convalescence. Until a few years ago we had paid little attention to the use of heliotherapy in the purely pulmonary type of tuberculosis. Many who had attempted to employ it in dealing with this form of the disease had reported unfavorable results, their chief objection being that it produced hemoptysis,

Results of treatment of cases that were discharged from J. N. Adam Memorial Hospital up to Jan. 1, 1925, and who remained in the institution three months or longer.

DIAGNOSIS	TOTAL	APPARENTLY RECOVERED	ARRESTED	IMPROVED	UNIMPROVED	DEAD
TB. OF LYMPH NODES	439 OR 46.3%	352 OR 80.1%	44 OR 10.1%	26 OR 6%	6 OR 1.3%	5 OR 1.1%
TB. OF PERITONEUM	107 OR 10.9%	79 OR 73.8%	14 OR 13.1%	2 OR 1.9%	7 OR 6.9%	
TB. OF SPINE	75 OR 8.1%	28 OR 37.3%	21 OR 28.%%	9 OR 12.%%	13 OR 17.3%	4 OR 5.3%
TB. OF HIP	80 OR 8.1%	53 OR 66.3%	15 OR 18.7%	7 OR 8.7%	4 OR 5 %	2 OR 2.5%
TB. OF SACRO-ILIAC JOINT	6 OR .6%	3 OR 50 %	2 OR 33.3%			1 OR 16.6%
TB OF KNEE	43 OR 4.5%	22 OR 51.1%	12 OR 28.5%	4 OR 9.5%	2 OR 4.7%	2 OR 4.7%
TB. OF ANKLE AND FOOT	28 OR 3 %	21 OR 75. %%	5 OR 17.8%	2 OR 7.1%		
TB. OF WRIST AND HAND	28 OR 3 %	20 OR 71.4%	6 OR 21.4%	1 OR 3.6%		1 OR 3.6%
TB. OF HUMERUS	1 OR .1%		1 OR 100.%			
TB. OF FEMUR	5 OR .5%	2 OR 40. %	2 OR 40.%	1 OR 20.%		
TB. OF ISCHIUM	1 OR .1%	1 OR 100. %				
TB. OF STERNUM	3 OR .3%	2 OR 66.6%	1 OR 33.3%			
TB. OF KIDNEY	34 OR 3.6%	7 OR 20.6%	16 OR 47.%%	7 OR 20.6%	3 OR 8.8%	1 OR 2.9%
TB. OF EPIDIDYMIS	13 OR 1.3%	6 OR 46.1%	5 OR 38.4%	2 OR 15.4%		
TB. OF EYE	21 OR 2.2%	12 OR 90.5%	1 OR 4.7%		1 OR 4.7%	
TB. OF JAW	1 OR .1%	1 OR 100. %				
TB. OF SHOULDER	7 OR .7%	2 OR 28.5%	3 OR 71.5%			
TB. OF ELBOW	11 OR 1.1%	7 OR 63.5%	4 OR 36.5%			
TB. OF SACRUM	1 OR .1%	1 OR 100.%				
TB. OF PHALANGES	12 OR 1.3%	12 OR 100.%				
OSTEOMYELITIS (NON TB)	26 OR 2.7%	13 OR 50. %	7 OR 26.9%	6 OR 23.1%		
LUPUS AND TB ULCERS	5 OR .5%	4 OR 80.1%	1 OR 20.1%			
TOTAL	935 OR 100.%	654 OR 70.%	162 OR 17.3%	67 OR 7.1%	36 OR 3.8%	16 OR 1.6%

The above does not include 49 cases of pyopneumothorax and 98 cases of pleurisy with effusion.

fever, and often reactivated the disease. To prove or disprove these claims in the treatment of pulmonary tuberculosis with sun-cure, we treated during the years 1922 and 1923, 80 cases of pulmonary tuberculosis. We chose patients who were moderately advanced, and advanced cases who were doing poorly under the ordinary sanatorium régime. Some of these cases were having a daily temperature ranging from 99 3/5° to 101°, and some had had repeated hemorrhages. All of these cases responded most satisfactorily. The temperature of those with fever gradually came down to normal. No hemoptysis developed, not even in those that had had repeated hemorrhages. There was no reactivation of the disease. Cough and expectoration became lessened, and weight was put on by practically all of the patients. The physical signs showed lessened moisture in all of the cases.

While we do not recommend sun-cure in the acute type of pulmonary tuberculosis and where temperature is very high due to acute complications, such as pleurisy, pyopneumothorax, and in cases with very recent hemorrhage, we do not consider a temperature of 100° or 101°, hemoptysis, chronic pleurisy and pyopneumothorax as contra-indications. It may be possible that the unfavorable results reported in pulmonary tuberculosis treated by heliotherapy are due to its improper application. If it is given in small, repeated doses, and in the early and late part of the day during the summer months, there will be no likelihood of complications occurring.

We are so satisfied with the results obtained in the treatment of pulmonary tuberculosis by heliotherapy that we contemplate giving sun treatment to all of our pulmonary cases with the exception of those in which the disease is very active.

In conclusion, may I emphasize the following points:

1st: That our present knowledge of the etiology, portal of entry and dissemination of tuberculosis justifies the opinon that so-called "surgical tuberculosis" is only a localized manifestation of a general constitutional disease, the primary focus of which is in the lung or lymph node, and that we must therefore treat the disease as a whole and not its manifestation only.

2d: That any measures, whether radical or conservative, that tend to lower the resistance of the patient and aggravate or reactivate the disease, or that will deprive the patient of those forces that tend to build up his body resistance, should be looked upon with disfavor. Rest, fresh air and sunhine have been, and are, our mainstay in the treatment of pulmonary tuberculosis, and if this holds true in the pulmonary type of tuberculosis it also holds true in the extra-pulmonary type.

3d: That operative procedure does not remove the cause but tends to aggravate or reactivate the primary focus in the lung or lymph node, also, by attempting to remove the localized disease area, likewise break down the wall of granulation and connective tissue which nature so kindly provides as a protection to the surrounding normal structure; thus it often opens up new areas to infection and increases the possibility of a generalized tuberculosis.

4th: Operative procedure favors ankylosis and thus destroys the functions of a joint, while heliotherapy favors the preservation or reëstablishment of function in a joint.

5th: Operative procedure is justified only: (*a*) In those cases in which, in spite of heliotherapy and the resulting good general physical condition, the local lesion has not shown any satisfactory improvement. (*b*) To correct deformities developed during the course of treatment in spite of all the efforts to prevent them. (*c*) To provide stability by an arthrodesis in a flail and useless articulation. (*d*) To evacuate abscesses, and this only by aspiration or a small incision when the pus is very thick. (*e*) In renal tuberculosis of the advanced stage, or where there is considerable destruction.

If surgery must be resorted to, it is best that it is preceded and followed by heliotherapy.

The Psychology of the Tobaccophobe

BY O. VICTOR LIMERICK, M.D.
Director Department of Pharmacology, Brooklyn Diagnostic Institute, New York

Of all the problems that remain unsolved by psychologists none is more baffling than the hold which myths often have on the popular mind. Myths frequently become so firmly fixed in the popular mind that they seem destined to outlive every conceivable form of refutation. A deeply rooted myth often accounts for popular opinion that holds no relation whatever to the verities. And strange as it may seem, the most intelligent supporters of a particular myth are usually the ones that are moved to ill-tempered resentment by the presentation of facts that prove it to be utterly groundless.

The wide-spread and seemingly unyielding prejudice against the use of tobacco is based on a myth that reminds one of the history of the common tomato. In the sixteenth century the Spaniards brought the tomato into Europe from South America, and it became known in Italy as Pomo dei Mori (Moors' Apple). Similarity of sound made it Pomme d' Amour (Love Apple) in French, and this at once gave rise to the popular belief that there was "something sinisterly dangerous" about this vegetable. Even to this day the tomato is avoided as a poisonous and evil-doing plant by the peasants of several districts of northern France. The hold of this myth on the minds of these peasants is too strong to be broken by the fact that the tomato long ago became a favorite vegetable in almost every other part of the world. There is—or should be—wholesome admonition against prejudices born of ignorance in the fact that the tomato is now recognized as a source of one of the most important vitamins.

The popular opinion about the effect of tobacco on man is of special interest to those engaged in scientific pursuits; for, in accounting for its origin and its pertinacity, we inevitably arrive at a better understanding of why some of those who have been highly trained in a particular branch of science often fall into serious error when they venture beyond its borders. We also come to see why the researcher must use rigorous measures to guard against self-deception, which so often accounts for erroneous conclusions.

The verdict of science is and must always remain contrary, in some degree or respect, to popular opinion. This is because the conclusions of the more fortunately endowed and the more highly trained are invariably based on a consideration of factors that are beyond the comprehension of the average mind. Scientific research is not a pursuit for minds of the pious or poetic type. The laboratory of the researcher has no attraction for the grades of intellect that are drawn into politics or commercial pursuits or are pushed into menial occupations. In the case of the researcher, the traditions of a thousand years count for nothing if they are repudiated by a single verity. But the average person makes consecrated notions objects of sentimental adoration. The researcher possesses an intellectual courage which prevents tradition from affecting his interpretations of phenomena, but the average person is inherently hostile to any experimental verifications that may cast a shadow of doubt on his soothing presuppositions or long-cherished delusions. The researcher is guided by knowledge of cause and effect, but the average person is wont to be swayed by poetry mistaking itself for science. The researcher seeks out the truth, and then proclaims it without regard for any effect the truth may have on emotional bias or popular opinion; he is totally indifferent to what his discoveries may cost him, if measured in terms of mass popularity.

It is true, of course, that knowledge always advances by process of trial and error. But if the errors found are wittingly or unwittingly concealed, they are apt to be repeated by others embarking in the same line of investigation. A hundred repetitions of the same blunder may deceive an unlimited number of persons, so it has come to be a truism in research circles that a fact unearthed by a single individual very

often rectifies the accumulated errors of many centuries.

One of the chief causes of perplexity relative to any problem in science is the common failure to make proper distinction between a prevailing opinion and an established fact; between what is *believed* to be true and what is *known* to be a reality. And inasmuch as the prejudice against the use of tobacco is based almost entirely on popular opinion, it is important that we know how this popular opinion originated and why it is still shared by a considerable number of persons whose attainments are not open to dispute. In other words, the necessity arises for a study of the psychology of the tobaccophobe of both low and high type.

But before adducing facts to prove that the prejudice against the use of tobacco is a result of popular delusion, it will be helpful to briefly recount a few other popular opinions that are equally incompatible with what we choose to term common sense. When we pause to note the absurdity and the pertinacity of these popular opinions and to bear in mind that some of them are still shared by highly educated folk, it ceases to be difficult for us to understand why a great number remain steadfast in the belief that tobacco is a menace to mankind, in spite of the positive proof to the contrary. The astonishing thing about popular opinions is that they seemingly flourish best in the midst of evidence that should effect their complete undoing.

Medieval critics of astronomy insisted that there could be only seven planets, because there are only seven days in a week. Here we recognize a popular opinion resulting from a primitive sense of the fitness of things, which prevented an evident fact from being admitted to consciousness; an unwillingness to recognize a palpable truth merely because it would not harmonize with a fixed notion.

For more than two thousand years the popular opinion has been that, when pursued, the ostrich buries his head in the desert sand in the belief that he thus conceals himself from his carnivorous enemy. It is patent that if the ostrich did do such a silly thing his throat would be leisurely cut by the attacking beast, yet this popular opinion is still fostered by some of our school-books.

The popular opinion is that the North Pole is the coldest place in the northern hemisphere, and that the polar regions are far colder than any country inhabited by civilized folk. This could not possibly be true, yet we are assured by Vilhjalmur Stefansson that it is always with great difficulty that he succeeds in convincing even graduates of our leading universities that the polar regions are never extremely cold—never as cold as some of the well-populated sections of the United States. In order to be extremely cold a place must have latitude, altitude, and distance from the ocean. The polar regions have neither altitude nor distance from the ocean, so they naturally cannot be extremely cold. Here again we have a popular opinion due to common failure to apply knowledge that should be in the possession of the average schoolboy.

It can thus be seen that popular opinion need not hold any valid relation to what is true, and that it is often entirely erroneous. It could not be otherwise, for the majority of persons lack the intellectual resources that are necessary to the solution of ordinary problems. We have it from excellent authority that "ninety-six per cent of the people of the United States are below the accepted standard of intelligence." If we put aside false pride and appraise popular opinion with the open-mindedness with which we are wont to take up a problem in mathematics or chemistry, we come face to face with some very humiliating facts. Popular opinion is not the crystallization of independent and self-relying inquiry and meditation; on the contrary, it is the scum of mass reaction. It is composed, in large part, of beliefs that cannot endure casual scrutiny, much less the rigorous tests of enlightened criticism. It is thick with fossilized misconceptions held in suspension by stultifying tradition. It contains the emotionalisms of the neurotic, the preju-

dices of the illiterate, the fantasies of the feeble-minded, and the hallucinations of the common drunk.

A highly educated and well-balanced widow that has always led a circumspect and conventional life suddenly becomes a patron of astrologers, clairvoyants, magicians, or healers, and quite active as a parlor Bolshevik. To the amazement of her friends, she shows a new interest in all movements for the "good of the herd" and very likely evinces an affection for dogs or cats which she did not formerly possess. A certain physiological deprivation has finally passed the bounds of restraint and is expressed in a startling change in her response to stimuli. Popular opinion consists, in part, of the eccentric views of this familiar type of psychoneurotic. A man—such, for example, as a Sir Oliver Lodge or a Conan Doyle—who has achieved great distinction in one or another branch of science or of literature may, as a consequence, say, of some emotional trauma, suddenly startle the world with the announcement that he is in personal communication with the spirits of the dead. As a rule, popular opinion is profoundly influenced by the specialized delusions of a renowned individual, because the lay mind cannot be made to understand that extraordinary enlightenment or talent in one branch of intellectual endeavor does not necessarily imply superior or even average ability in other branches. William Jennings Bryan lays aside the megaphone, picks up the flute and fills the air with a sort of melody that redoubles the confidence of pious souls in the hallowed account of the creation of Adam and Eve. Not to be outdone by mere man, the Ladies' Auxiliary of the Order of Forbidders places itself on record as being "terribly" opposed to the use of pretty dogs in the experimental study of any disease, except (of course) superfluous flesh and wrinkles. Then, too, the followers of Dowie, Abrams, Coué and Mother Eddy are to be remembered as liberal contributors to popular opinion. It can thus be seen that, in spite of the labored panegyrizing of demagogues, popular opinion is quite apart from the concerted views of the best informed.

Refinement of our methods of conducting research, especially in the field of psychology, has disclosed the fact that much of the controversy that arises when serious attempt is made to ascertain which conclusion is the correct one results from blunder on the part of the controversialists. The fact that differences between conclusions invariably denote dissimilarities of the function of individual organs of thought escaped recognition for a long time. Two normal minds working under identical circumstances cannot possibly receive irreconcilable impressions from any outside source. Consequently, when irreconcilable conclusions are arrived at by men studying phenomena under identical circumstances, the inconsistency must be due to some dysfunction of the organs of thought of one of the investigators. The blunder of the controversialists is that they overlook the dysfunction. One of the most admirable traits of the accomplished researcher is his habitual vigilance with respect to a possible dysfunction, which may lead him to an erroneous conclusion.

It is quite true that in every form of observation one comes by practice to appreciate shades of difference that at first could not be detected, but even the most skilful and experienced are apt to observe what harmonizes with their own conscious or unconscious "set." Investigators are often deceived by their own and unsuspected emotional luxations. Then, too, a disproportionate emphasis on an insignificant fact, which is unintentional, may affect the relation of an observation to the laws of consistency. Again, the quality and the degree of an anticipation may determine, to some extent, what will be admitted to consciousness. So researchers have come to know that the checking up of the observations of one trained investigator by another trained investigator is the best possible safeguard against self-deception. A single error in the interpretation of phenomena may vitiate an investigation, so we need not be surprised at the frequency with which irrecon-

cilable conclusions have been arrived at in the study of the effect of tobacco on man, seeing that almost every grade of intellect has engaged in it at some time. Self-deception is undoubtedly the most probable cause of the irreconcilable conclusions. Bias is the greatest enemy of truth, and bias often arises from a "set," or emotional presupposition, that is not in the awareness of an investigator. A mental attitude quickens attention for one group of things at the expense of attention for other things of possibly greater importance to the problem in hand. The dominating influence in certain intellects is a "set," which frequently gives direction to the current of their thoughts. Imagination often supplies the missing gaps in a picture. If it didn't there would be no such thing as motion pictures. The quality of a "set," or presupposition, is an excellent clue to the conclusion an investigator will arrive at, and the "set" of many of those who have studied the effect of tobacco on man is frequently exposed by the impetuosity they involuntarily display toward those whose views on the subject do not coincide with their own.

An assumption very often proceeds from a "set," and it may prove helpful as a preliminary in an investigation. But an assumption is not a fact, and its value must always remain dubious until a conclusion reached by its aid has been tested and proved in the actual procedure of experience. A thing is considered true in the scientific sense only when it can be proved and reproved by established formalities of substantiation. The popular opinion relative to the effect of tobacco on man cannot survive any of the tests having scientific respectability. It has been rejected by present-day scientists because precise methods of investigation have proved it entirely out of harmony with fundamental laws of consistency.

When we make a stringent examination of the theories that have successively supported the belief that tobacco causes disease of the body or of the mind or of both body and mind, it becomes difficult for us to understand how these theories could have escaped refutation for so many years. It becomes next to impossible for us to understand how the higher grades of intellect could have been led and kept astray by a succession of assumptions, each one of which might have been completely shattered by a moment's sober reflection. The unconscious harboring of an emotional bias and the unsuspected absorption of conventional opinion is the only way of accounting for the longevity of the erroneous theories.

When the first voyagers to the Western Hemisphere learned of tobacco from the Indians and, on their return, introduced it into Europe, opposition to its use was at once based on the assumption that the drawing of smoke into the lungs, as in the act of inhaling, must certainly cause some sort of lung disease. In course of time this belief became almost world-wide, and it still prevails in some quarters. Now the truth is that very little smoke ever enters the lungs when it is "inhaled" by a smoker; it is not conveyed further than the larynx, for reasons that will presently become obvious. It may be said at this juncture that a greater number of non-smokers than smokers were discharged on account of tuberculosis during the draft of soldiers for the World War. But this statistical fact is offered merely as pertinent interpolation, for we are chiefly concerned at this moment in a common human weakness, namely, the failure to apply the knowledge we possess when confronted with a new problem.

To the average mind there is something inhumanly shocking in the way scientists turn destructive rays of light on venerated notions. The crushing of their favorite superstition or pet delusion by prosaic truth is heartbreaking to many folk. The truth that will immediately follow will doubtless prove distressing to some poetic souls: the habit of inhaling tobacco smoke is every whit as pure and undefiled in origin as is the habit of kissing. The simple truth of the matter is that the two habits are kin. More than that, they are very closely related to the habits of caressing and hugging. Why? Because our sense-organs (vision, hearing, taste, and touch) were slowly

evolved from simple sensitive patches in the skin. In the infinitely long ages of evolution these tiny sensitive patches have developed into the wonderful mediums through which external impressions are received.

In the ordinary experiences of life we are constantly being bombarded with proof of the common origin of our sense-organs. But the pity is that not one person in ten thousand possesses sufficient powers of observation or sufficient interest in natural phenomena to notice the bombardment. Whatever makes a pleasurable impression on one of our sense-organs is certain to make a like impression on another sense-organ; conversely, whatever makes a disagreeable impression on one sense-organ will make a similar impression on another sense-organ. A thing that is pleasing to the eye always excites in us an impulse to touch it, and this fact accounts for the origin of the habits of stroking, caressing, hugging, patting, and kissing, which are, in the last analysis, nothing more nor less than different degrees of *touching*. When we see, say, a pretty child, we at once feel an impulse to pat, caress, hug or kiss it, the force of the impulse varying, according to the constitution of the "reactor" or individual response to stimuli. Women who kiss cats, dogs or other beasts are deficient in inhibitory power. When his master returns after a long absence, the dog licks his hand because he is glad to *see* him. But when we see, say, a dead rat, we immediately feel an impulse to turn our eyes away from it and "hold" our noses. When we see a beautiful flower, we "inhale" its perfume in order to expose as much of it as possible to the myriad little olfactory terminals in the nasal cavities, which give us the sense of smell. Right here we have an explanation of the fact that smoking in the dark does not afford a full measure of enjoyment to those habituated to tobacco—the smoke cannot be *seen*. There are no *nerves of taste* nor *nerves of smell* in our lungs, so it must be obvious that the drawing of tobacco smoke into the lungs cannot possibly give rise to a pleasurable sensation. As a matter of fact, when tobacco is accidentally drawn into the lungs, which is a common experience of novices, it invariably excites an expulsive cough. The "inhalation" of tobacco smoke (drawing it as far back as the larynx, not into the lungs) is simply an act preliminary to forcing the smoke against the nerves of *taste* and *smell*, which are situated only in the mouth and nose. The pleasurable impression derivable from smoking is proportional to the amount of surface of these nerves that is exposed to the volatile materials incorporated in the tobacco smoke. The blowing of smoke through the nose, which is a practice of many habitual smokers, is an extension of surface to the volatile materials. The popular belief that tobacco smoke causes disease of the lungs came to an end in enlightened circles about the time that the red in flannel shirts lost its reputation among consumptives.

The next assumption advanced in support of the contention that tobacco "plays havoc" with both body and mind was that nicotine, which is a very powerful substance, is the captivating constituent of tobacco and the actual cause of the craving which ultimately results in an habituation. This belief in the fascinating and deleterious potency of nicotine became so widespread and was shared by so many men of professional eminence that none but the most courageous dared express a contrary opinion or even a doubt. The very processes of reasoning by which scientists arrive at conclusions were inverted in order to give this theory so much as a semblance of plausibility. Whenever an addiction to a drug has been established the addict feels the need of, and often actually requires, "ascending" doses of that drug. In almost every instance the craving eventually becomes so intense that the addict prefers or requires his favorite drug in its most concentrated form. Hence we observe that an opium addict prefers morphine to the crude drug, and the cocaine addict prefers the isolated alkaloid to the leaves from which it is obtained. This is the exact reverse of

what is true in the case of those habituated to tobacco. Despite the fact that nicotine is available to every one, it being the insecticide in common use by gardeners and farmers, no one has ever seen a "nicotine-taker." It is is a significant fact that there is no such thing as nicotine pills or tablets in the market. There is, in fact, no appreciable relation between the amount of pleasure derivable from a given kind of tobacco and its nicotine content. The preference of the average smoker is so strongly in the direction of mild tobacco that manufacturers find it expedient to stress the mildness of their respective brands. The cigar is rapidly giving way to the cigarette, which is the mildest form of smoking tobacco.

The theory that the injurious effect of tobacco is due to the carbon monoxide present in its smoke can be dismissed with the statement that there is more carbon monoxide generated by automobiles during traffic jams in New York City in one day than can be got out of a whole year's crop of smoking tobacco. And New York is a health resort!

Moved to caution by the nimble manner in which scientists have shattered their theories, one after another, the tobaccophobes took recourse to what must have appeared to them as far beyond any such refutation as the test-tube or microscope might supply. They took the stand that, in some way or other, tobacco lessens mental alertness, lowers scholarship, and impairs deportment. This charge inspired some of the finest antitobacco oratory of the day. It spread to pulpits, legislative halls, and sewing circles. Then misfortune set in again. Teachers and principals of all sorts of schools began compiling and publishing statistical data supporting the contention. This naturally attracted so much attention to the subject and provoked so much intemperate discussion of it that researchers were moved to make a searching investigation of the soundness of the contention. The thing that immediately cast suspicion on the spoken and printed convictions of these schoolmasters and school principals was the fact that, almost without exception, these well-meaning souls attached greatest blame to the mildest form of smoking tobacco (the cigarette) and were unaccountably mute with respect to the strongest form (the pipe), which is quite a favorite with student bodies. Here was a palpable inconsistency that could not possibly escape the notice of exacting scientists, and it would have to be explained in accordance with the inflexible rules of logic before any value whatever could be attached to the conclusions reached by these custodians of adolescent minds.

The plight of the average schoolmaster is indeed a pitiable one. In spite of the fact that the responsibilities which beset him are momentous, he receives less for his services to society than does the ordinary bricklayer. Inherent superiority of mind and scholastic attainments do not always determine the position he shall hold nor the compensation he shall receive. On the contrary, his general fitness as an educator of young men or young women is usually measured by the sum of parental favoritism he can acquire. As a rule, it is proportional to the esteem in which he is held by the mothers of his pupils. Consequently self-interest, if not self-preservation, reduces him to a state of defensive hypocrisy. He dare not admit facts that do not harmonize with tradition, for fear of losing his position. He is incessantly haunted by the ugly fact that many of the mothers of his pupils still think, or think they think, that ignorance is synonymous with "purity." He must at least affect sympathy for whatever view is moldy with accumulated tradition. He is not supposed to encourage his pupils to approach subjects with a critically open mind. He must dogmatically repeat what accords best with the sentiments of the parents of his pupils. He must inveigle them into paths of blind acceptance and burden their minds with a mass of vestigial nonsense, because their mothers will have it so. In teaching biology, physiology, or embryology, he must always hit the nail squarely on the thumb, in order that he may not give offense to those who have a voice

in the management of his school. Now, it is perfectly obvious that in the circumstances the average schoolmaster must, in time, consciously or unconsciously, regard a pupil whose general deportment is always exemplary and whose demeanor is excessively submissive with a shade of sentiment that he cannot bestow on a pupil that is somewhat recalcitrant, even though, as is often the case, he possess superior ability.

It has been seen that we are apt to observe what harmonizes with our own conscious or unconscious "set," or emotional bias; that the degree of an anticipation may determine what will or will not be admitted to consciousness, and that a mental attitude quickens attention for one group of facts at the expense of attention for another group of facts of possibly greater importance to the problem in hand. Seeing that this is true, it is inevitable that the average schoolmaster, who is totally inexperienced in scientific procedure, will discover slight infractions of his rules of deportment and inconsequential flaws in the class-work of a student having what he considers a vice that would very probably escape notice in the case of another student whose habits accord in every respect with his idea of unblemished gentility. The opinions of schoolmasters relative to the effect of tobacco on mental alertness and scholarship are made scientifically worthless by the fact that they are products of self-deception. They are as unconvincing as an old-time revivalist's description of purgatory.

M. V. O'Shea, Professor of Education, University of Wisconsin, and member of the Committee to Study the Tobacco Problem, is author of a book, recently published, entitled "Tobacco and Mental Efficiency." In speaking of the irreconcilable opinions of men, as they are commonly expressed, this author says: "There is another possible explanation of the difference in testimony given by different groups of men. *The men of distinction felt under no compulsion to express conventional views. There was nothing whatever to be gained by misrepresenting their experience. Being men of distinction, they probably possess an unusual degree of independence of thought and judgment, and freedom from conventional restraint. They would, therefore, be less influenced by traditional views than would the typical individual of average attainments. They have probably given an accurate and faithful statement of their experience with tobacco, so far as they have been able to analyze it.*" (The italics are the writer's.) Here we have the admission that the opinion of "the typical individual of average attainments" relative to the effect of tobacco is of no value because he feels more or less "compulsion to express conventional views." Professor O'Shea makes this further admission: "Leading reformers, who should be regarded as creative thinkers, have generally been non-smokers, *but the men who have created new nations, new types of government, who have welded nations together, and who have in other ways exhibited marked creative ability, have often been smokers.*"

At the present moment a considerable number of persons seem stirred up about the possibility that cigarette smoking will prove ruinous to the minds and morals of our young women. A magazine of world-wide circulation has quoted a physician as saying: "It (tobacco) fouls the breath and makes women unwomanly." This sort of loose talk is a stench in the nostrils of real scientists. Tobacco has no specific action on the organs that differentiate the sexes, so it can neither make a woman unwomanly nor a man unmanly, in the sense in which these terms are used by respectable medical authorities. Nothing could possibly be more allowable than recourse by women to things that will draw attention to them. The bejeweled cigarette cases of our flappers will probably go the way of the snuff-boxes of our great-grandmothers just as soon as something more alluring intrudes on the feminine mind.

The history of human experience, as well as the results of exhaustive investigations conducted by men highly trained in scientific research, point to the fact that the moderate use of smoking tobacco is not harmful to either the body or mind. The welfare of every organism, whether it be ameba or man, is determined by the totality of its

gainful reactions to its environment. Man is continually struggling to adapt himself to his artificial and vacillating environment. Every innovation of modern civilization adds to the intensity of this struggle, which is superficially expressed in animosity, irascibility, envy, greed, dejection, inflation, or other emotional stresses involving excessive psychoneurotic taxation. Beyond shadow of doubt, tobacco does aid the adaptive mechanism of man. This fact has been confirmed with statistical finality. Under its soothing influence the jars and frets of the moment soften and the smoker thus gains a repose in which his powers of perception are better poised, his ideas flow more freely, and his various responses to stimuli are improved in quality.

Hot Water in Eclampsia

BY OTTO KIENE, M.D., AND ROSS E. WEAVER, M.D.
Concordia, Kansas

The proper method of treatment of any case of eclampsia offers a great many difficulties. No matter whether the patient is delivered or not, and no matter what method of narcosis is used, chloroform, morphine, chloral, or any combination of them or others, it seems that some cases must go on to a fatal termination. The convulsions and other grave symptoms are a direct result of a toxemia, and usually are not entirely relieved until the toxins are eliminated. The only points available for quick and efficient elimination are the skin and bowels. Free catharsis is seldom advisable on account of the possible infection of the operating field in women still to be delivered, and the delay in producing noticeable results in postpartum cases.

Effective diaphoresis has been very disappointing. The old "sweat cabinets" were always difficult to use on an ambulatory patient, and to attempt to place in one of them, and keep long enough to secure elimination, a patient who might be having convulsions every fifteen or twenty minutes is an undertaking of such difficulty that it was soon abandoned. The elimination derived from hot packs seemed rather to cause a new convulsion than elimination.

Since 1920 we have been securing the desired diaphoresis without any of the objectionable features by putting hot water directly into the stomach of the patient. A long and large catheter is passed through one nostril and a funnel attached, or a stomach tube may be passed by mouth but must be protected from the teeth. From three to six pints of water as hot as the hand can stand are then poured as rapidly as possible into the stomach. The amount is best determined by filling until the tube overflows. Sweating occurs quickly and profusely. There is usually marked relaxation, and the patient is supplied with water, of which some are in very great need. It serves as an effective purge and relieves rather than aggravates vomiting.

This method we have used in 15 cases, one of which had eight postpartum convulsions in six hours and another which had twelve in the first forty-eight hours after delivery. All of them recovered, and in 12 of them there were no convulsions after the hot water was given. In two of the others the water was repeated three and four times, respectively, before the convulsions stopped. The other case was one which had eight convulsions in six hours, beginning about twelve hours after delivery. After her stomach was filled with hot water she sweat profusely, relaxed, and slept, but had two more convulsions in rapid succession twenty-four hours later. The treatment was repeated, and the patient had no more convulsions. All of these patients were given morphine, and most of them were given some choloform during the convulsions. The first three on which it was used were also given 15 grains of chloral in the water.

The Diagnosis and Treatment of Chronic Renal Infections in Women

BY HYMAN M. GINSBERG, M.D., Philadelphia, Pa.
Assistant Demonstrator of Gynecology in the Jefferson Medical College

With a foreword by

BROOKE M. ANSPACH, M.D.
Professor of Gynecology in the Jefferson Medical College

[From the Gynecological Department of the Jefferson Medical College Hospital]

The basis of successful therapeutics is an accurate diagnosis. Once the doctor is certain of the disease, he is then in position to select the remedy and to apply it; and while in doing so he must exercise judgment and discretion, and although it requires knowledge and experience to determine the cause of action, his task is much easier than if the underlying pathology were in doubt.

For this reason, if for no other, any new diagnostic light upon symptoms which are difficult to interpret is welcome and worth knowing. In the following article, Dr. Ginsberg gives his experience with certain diseases of the ureter and kidney of which the symptoms are not always plain and the diagnosis obvious. Hunner's work on ureteral strictures has been a great advance in urology, but the question has been raised as to whether in his scientific enthusiasm the originator has not been too ready to call a narrowing of the ureter a stricture, and to lay symptoms at its door which belong elsewhere. In order to judge without prejudice, we have had Dr. Ginsberg study all cases in the gynecological department in which the symptoms might indicate a ureteral or kidney lesion, or in which abdominal and loin pains were not clearly referable to some other organ.

In treating the diseases of women, the gynecologist is often confronted with patients presenting such a variety of symptoms that it is difficult to determine the organ in which they originate. It is *not* unusual for the patient to refer all of her symptoms to the upper abdomen and yet exhibit the underlying pathology in her pelvis. It *is* unusual to see women with urological symptoms in which there does not enter some question in gynecology, and very often it is difficult to decide from the patient's complaint whether the source of her symptoms lies in the genital or in the urinary tract. We therefore made a urological study of all patients with obscure abdominal pain in which the pelvic examination was negative. Although many gave no history of urinary symptoms, it was surprising to find that the pain was often due to lesions in the ureter. The appendix had been removed in over 20 per cent of these cases without relief of the pain or distress which prompted the operation.

We found that the majority of these patients were suffering from a chronic ureteritis or a strictured ureter; in a few there was a ureteral calculus.

It is a well-established fact that the kidneys under varying circumstances of health and disease include in their function the excretion of bacteria from the system. Normally the kidney can eliminate without harm to itself various bacteria carried to it by the blood, and it probably becomes infected only when its resistance is lowered by some form of obstruction, such as a tumor, calculus, or a strictured ureter. Pyelitis is usually considered to be an inflammation of the pelvis and calyces of the kidney, but with few exceptions the ureter is always involved.

It is admitted by every one that kidney infections can and do take place through the blood, but whether there is an ascending infection through the lymphatics or a direct extension up the ureter from the bladder is a disputed question. Experimentally it has been shown by Cunningham and Graves[1] that you can produce a regurgitation of fluid up the ureters in rabbits, and

they believe ascending infections often occur in this way.

How do such conditions arise, and what produces them? A chronic ureteritis may be the sequel of either a vesical or a renal inflammation, and as vesical inflammations are more common than the renal there is usually an associated trigonitis. There may be a direct extension of the inflammation along the mucous membrane of the ureter.

What symptoms do these patients present which should direct our attention to the actual state of affairs? As the bladder is nearly always affected the symptoms are mainly referred to it. Frequency of micturition is usually the chief symptom. Both kidneys are generally infected, but the patient usually complains of the side in which the lesion is more marked. The majority show a colon bacillus infection. On cystoscopic examination the trigone is usually congested. The ureteral orifice is swollen and larger than the unaffected side; the difference is especially noticeable if the patient is examined in the knee-chest posture. It is not uncommon to find the trigone covered with small bullæ. A pelvic examination will usually elicit tenderness at the lower end of the ureter. While such is usually the case, it is not invariably so, and the cystoscopic examination of patients with obstructed ureters may be quite misleading. There may be only a slight congestion of the trigone and both ureteral orifices may appear perfectly normal. Of course, in those cases in which the obstruction is at the vesical orifice of the ureter, the ureteral opening will often be pin-point and round.

In about 70 per cent of the stricture cases the narrowing of the ureter was about one to one and a half inches above the bladder—that is, in the region of the broad ligament. Dr. Hunner[2] claims that the strictures of the ureter are frequent in this region because of the rich lymphatic supply; he also maintains that the underlying cause is some distant focal infection, and that the foci are most commonly in the teeth and in the tonsils.

While it is true that the majority complain of urinary symptoms, it is significant that in over 20 per cent of our cases there was no history whatever of symptoms directing attention specifically to the urinary apparatus, the chief complaint being a dull aching pain in the side or groin which usually became worse during menstruation, and the pain usually radiated down the thigh. On deep palpation there is usually tenderness in the right or left side of abdomen, but rarely is there rigidity of the abdominal muscles. The ureter is tender on palpation as it crosses the pelvic brim. This point is just below and to one side of the navel. This tenderness on the right side is often mistaken for a chronic appendix. The pain is often more acute during menstruation, as there is a congestion of the constricted area and an increase in the degree of urinary stasis.

The examination of the urine in the majority of the cases was somewhat misleading. The kidney specimens with few exceptions would show only a few leucocytes, but desquamated epithelial cells in varying amounts were always present. I am sure that heretofore we have overlooked a large number of chronic pyelitis cases by considering the epithelial cells of no pathological significance.

In these patients where the abdominal pain is vague and indefinite and the symptoms do not refer to any special organ, in order to exclude the urinary tract, it is necessary to resort to ureteral catheterization. The kidney may be excluded as the cause of attacks of abdominal pain when filling of the renal pelvis produces a tension and a sensation which is differently located from the abdominal pain; but if the sensations are the same it is presumptive evidence that the source of the symptoms is in the kidney. If the origin of the abdominal pain is in the ureter, the symptoms will be aggravated as the renal catheter is passed up to the kidney.

It is a disputed question not only among gynecologists but also among urologists as to the frequency with which constricted ureters are encountered in chronic infections of the kidney, and as to what consti-

tutes a stricture of the ureter. There is a difference of opinion concerning the normal caliber of the ureter and how much narrowing in certain parts may be considered normal. Some think that if they are able to pass a No. 6 or 7 catheter up to the kidney that there is no narrowing of the ureteral lumen. With the hope of reaching some definite conclusion on this question we examined eight autopsy specimens of the female bladder and ureter furnished us by Dr. B. L. Crawford of the pathological department of the Jefferson Hospital, and also examined a considerable number of women who were free of urinary symptoms and had no disease of the urinary tract. It was noted that catheters upon which were placed three and one-third mm. wax bulbs (No. 9 F.) might be passed up a normal ureter without obstruction, and might without a definite hang be withdrawn. We are within conservative bounds therefore when we conclude that when a bulb of this size meets with obstruction during its introduction or shows a definite hang upon withdrawal, an actual narrowing of the ureter is present.

The successful treatment of chronic pyelitis is largely dependent on accurate diagnosis. While it is probably true, in some instances, that a pyelitis is secondary to a previous infection of the parenchyma, in many instances the infection in the parenchyma entirely disappears, leaving the pelvis and ureter involved. The majority of non-tuberculous kidney infections are undoubtedly secondary to some predisposing factor, such as pelvic inflammation, tumor, pregnancy, stricture, or some other mechanical obstruction, and the cure of the infection is dependent on the removal of the predisposing cause. It is also necessary to remove all foci of infection such as diseased teeth and tonsils. When renal lavage is instituted we depend more on the larger size ureter catheters than on the irrigation, as the most important part of the treatment is to secure free urinary drainage. Silver nitrate solution is generally used for the colon bacillus infections, and mercurochrome solution one-half to one per cent for the staphylococcus. The tolerance of the individual and the degree of reaction is tested out with a 1:1000 solution of silver nitrate; then the strength of the injection is gradually increased up to one-half per cent. The gravity method is always employed in the treatment. In some the inflammation appears to extend to all coats of the ureter. They probably have developed a periureteritis. They seem to resist all methods of treatment, and yet a pyelographic study of these cases will often show a normal size kidney pelvis and ureter. Sometimes the topical application of 5-per-cent or 10-per-cent silver nitrate to the ureteral eminence will give considerable relief.

In the treatment of the strictures we employ the method as recommended by Hunner. Through a modified Kelly cystoscope the strictures are gradually dilated with wax bulb catheters, at intervals of two to four weeks, depending upon the amount of reaction, as it usually takes about ten days for the ureter to return to normal after each treatment. If the constriction is unusually small it may be necessary to use whalebone filiforms followed with different size renal catheters before attempting to use the wax bulbs.

REFERENCES.

(1) Cunningham and Graves: Renal Infections, *Surg., Gynec. and Obst.*, July, 1924.

(2) Guy L. Hunner: Ureteral Stricture—Report of 100 Cases, *Johns Hopkins Hospital Bulletin*, vol. xxix, No. 323, Jan., 1918. Intractable Bladder Symptoms Due to Ureteritis, *Jour. of Urol.*, vol. iv, No. 6, Dec., 1920.

The Distribution of Insulin.

KELLY in the *Boston Medical and Surgical Journal* of May 14, 1925, claims that diabetic coma should be looked upon as an accident and hence avoidable. It occurs when the quantity of carbohydrate burned is insufficient to result in the simultaneous burning of fat. Often it has an exogenous origin, which we all recognize in the instance of the diabetic who breaks his diet and dies. Its endogenous origin is not

generally recognized. This has its best illustration in the development of diabetic coma in a patient who simultaneously with the diabetes has a high metabolism, as in exophthalmic goitre or in fever due to general or local infections. Coma of exogenous origin is preventable, coma of endogenous origin is usually preventable, but coma of either origin demands insulin and a knowledge of how to prevent it.

The prevention of diabetic coma, due to acidosis, as taught by various members of the staff at the New England Deaconess' Hospital, is as follows: Realizing that a patient cannot detect its onset, he is instructed whenever he feels ill from any cause whatsoever (1) to telephone his physician; (2) to go to bed; (3) to get some one to wait on him and thus reduce unnecessary exertion; (4) to drink hot liquids, a cupful an hour, of water, coffee, tea, broth, or water oatmeal gruel; (5) to keep warm; and (6) to take an enema.

The further treatment of coma begins with the arrival of the doctor. First of all he concentrates on the diagnosis, and though the patient is a diabetic and may have sugar and acid in the urine, proves to his own satisfaction that the coma is due to diabetic acidosis and is not to be explained by uremia, apoplexy, meningitis, acute infections, or drugs. Second, insulin is administered in 20- to 40-unit doses subcutaneously, often in 40-unit doses, particularly if one is dealing with a diabetes known to be severe. The dose is repeated in hourly intervals of 20 to 40 units until the sugar in the urine is clearly diminishing, when the interval is lengthened to two hours and the size of the dose is reduced. The bladder is catheterized and emptied each hour for the urinary test. Comparatively large doses of insulin must be continued for several days until the patient returns to his customary state. Blood-sugar tests are done, too, but not before each dose of insulin.

The injection of salt solution subcutaneously is considered of the greatest importance in order to afford sufficient liquid for the patient. Most coma cases receive two "subpectorals"; one of his severest cases received four without any recollection of them after she had recovered. All the patients are kept warm. All have an enema and usually salt solution by rectum. All are given caffeine. Most are given gastric lavage, though this is done with great care, because death from this procedure has been reported. It is always worth while to work over a case of diabetic coma. Even an infant or an old woman may recover. Frequently the case proves to be a recent and mild diabetic who has ignorantly and innocently gone astray. The treatment of coma is a day and night proposition for the first twenty-four hours. One must watch for a relapse into coma and be on the lookout for an overdose of insulin leading to an insulin reaction manifested by nervousness, pallor, occasionally diplopia, hunger, tremor, sweating, and, if unrelieved, unconsciousness. If one is cautious this latter condition seldom develops. It can be counteracted by a little carbohydrate such as a few teaspoonfuls of orange juice or corn syrup or an equal quantity of sugar given by mouth, rectum, or even 5 or 10 grammes of glucose given in sterile solution intravenously.

The diet of the patient in the first hours of recovery from coma consists of simple food, and this means carbohydrate. Their patients seldom take over 50 grammes in twenty-four hours. This is given as thin oatmeal water gruel, which contains about 4 per cent carbohydrate; ginger ale, about 5 per cent carbohydrate; or orange juice, 10 per cent carbohydrate. So many cases of coma come for treatment that to prevent confusion he has adopted a chart so that all details of the treatment can be clearly recorded each hour. It is essential that records of diet, urine, and blood be synchronized.

Every physician should carry a bottle of insulin in his bag. The early life-saving dose should be given when it will do the most good. The time lost in securing insulin may mean the death of the patient. One cannot wait until morning for insulin. If needed at all, it is needed at once.

Editorial

SOME FACTS AS TO RICKETS.

In a recent issue of the *British Medical Journal,* Webster and Hill contribute an interesting and important paper in regard to the etiology and therapy of rickets. Not only do they give an excellent summary of the work which has been done in England, on the Continent, and in the United States, but they add, to this gathering together of information obtained by other investigators, important facts developed in their own work, which in some respects confirms that of others, and in other respects goes further than has any other investigation up to date. Incidentally it may be mentioned that this research is a very good illustration of the value to human beings of experiments upon the lower animals.

The great prevalence of rickets among certain classes, and in certain cities in particular, results in an enormous amount of ill health and more indirectly in high mortality among children.

The paper is also an interesting one, because it is illustrative of how modern physiological chemistry can be wisely utilized in the investigation of the etiology and therapy of disease.

It is not possible for us to give in detail the experiments which they carried out. We can only summarize certain points, which we believe will be interesting to our readers. After reminding us that a number of investigators have shown that cod-liver oil causes a remarkable deposition of lime salts in the cartilage of rachitic animals and also in rachitic children, as shown by Allen and Park, they remind us again that Mellanby is largely responsible for the belief that this effect is dependent upon the fat-soluble vitamin A content in relatively large quantities in this oil. On the other hand a number of investigators have seemed to disprove this view, to wit, that vitamin A is the antirachitic agent, because they have shown that when it is absent from a diet, rickets is not induced, and McCollum and others, comparing the action of butter-fat and cod-liver oil, reached the conclusion that the oil did contain an antirachitic agent which was not fat-soluble vitamin A. They did this by exposing cod-liver oil to sufficient heat to destroy the vitamin, and found that the oil was still potent as an antirachitic factor.

It will be recalled that it has been proved beyond all doubt that sunlight, which has not passed through glass, and the rays from a mercury quartz vapor lamp possess remarkable power in curing rickets, it being the ultraviolet rays which possess the therapeutic power. Rats exposed to direct sunlight, or the ultra-violet light, when affected by rickets were cured, or if subject to conditions which induced rickets, were benefited by such agents.

So far as physiological chemistry is concerned, Webster and Hill remind us that a number of Continental and American workers have shown that the blood in cases of rickets is low in organic phosphorus, for while in normal children inorganic phosphorus is present in about 5 mgm. per cent in children with rickets, it may fall as low as 1 mgm. per cent, and if tetany is present the calcium content of the blood is also found below normal; in other words, diminished blood content of calcium and inorganic phosphate is constantly present in this clinical state, and it is interesting to note, now that we are deprived of the thought of cod-liver oil depending upon its vitamin content, it would seem that cod-liver oil administration results in an increase in these salts in the blood, as does also ultraviolet light, and, furthermore, the bones of animals so treated show the definite increase in mineral ingredients.

It has long been thought by active clinicians that a large factor in the production of rickets was not the lack of necessary substances in the food, but was dependent upon the fact that through some disorder of the gastrointestinal tract these agents were not absorbed. Here again much investigation has been carried out, and when we recall the fact that cod-liver

oil has proved so efficient, it is interesting to note that the ingestion of fat usually diminishes the absorption of calcium which is passed out in the feces as calcium soaps. For this and other reasons, Webster and Hill are strongly inclined to support the gastrointestinal theory of the etiology of rickets. This being the case, the idea arose that possibly bacteria were the cause of non-absorption, but various experiments carried out with so-called antiseptics and purgatives failed to show that the bacteria were active factors.

Those who are interested in this subject should by all means carefully study the paper which we are quoting, if for no other reason than the far-reaching and skilful experiments which were carried out regarding the effect of heat, moisture, poor food and other factors in the induction of the rachitic state.

Webster and Hill quote with approval some recent work of Robison which seems to indicate that bones in the process of growth contain an enzyme or ferment capable of splitting hexose phosphates into inorganic phosphate, so that if a strip of fresh young bone is placed in a solution of calcium hexose phosphate insoluble phosphate is deposited in the bone. Incidentally Robison has also shown that a hexose phosphate is a normal constituent of the blood and is found chiefly in the red cells. Whether this view will be confirmed by further investigation only time can decide.

Webster and Hill, so far as rats are concerned, did not find that exercise or lack of exercise produced much effect in the development of rickets, but they did find that if bone-forming material was supplied so that it was a bare minimum of what was needed, ultraviolet light would give protection from the development of rickets.

Webster and Hill revert to the popular idea that sulphur possesses some therapeutic value, an idea which is responsible for the frequent use in past times of sulphur and syrup in the spring, and for the use of this substance by animal dealers to improve the condition of their pets. Careful experiments seem to indicate that its effects are slight.

Reverting to the influence of ultraviolet light, Webster and Hill's experiments seem to indicate that both it and cod-liver oil greatly increase the retention of calcium and phosphorus in the body. As illustrative of how far many investigators have gone in the study of this interesting condition, attention is called to the work of Steenbock, Black, and Hess, who by radiating foodstuffs with the ultraviolet light have claimed that by this means rickets can be prevented. Hess even went so far as to radiate cotton-seed oil, which is normally inactive as an antirachitic agent. Various foodstuffs were employed by Webster and Hill in a study of this question. Unfortunately, they were unable to prove that the ultraviolet light exercises an influence upon all foodstuffs, but they agree with the above investigators that we have quoted that exposing certain foodstuffs, as, for example, flour and linseed oil, does do so, for animals so fed failed to develop the disease. Furthermore they found that vegetable sterol after it has been radiated has very great antirachitic power.

It has been claimed by McQuarrie and Kugelmasse that by a process of oxidation they can make cod-liver oil and egg-yolk give off radiant energy that will darken a sensitive photographic plate through a quartz screen, and that radiant energy might, therefore, be a factor to be considered in connection with foodstuffs and rickets.

Webster and Hill repeated the experiments of these American investigators, but were unable to obtain results similar to those just quoted.

It is evident, as we said at the beginning of this note, that this disease has now been investigated in a remarkably thorough manner by a host of skilled persons, that a remarkable amount of valuable information has been obtained concerning it, but that notwithstanding these facts it is also apparent that the field is still, in some parts at least, unexplored.

THE TOXIC EFFECTS OF CARBON TETRACHLORIDE.

Carbon tetrachloride now possesses great importance from both the therapeutic and toxicological standpoint. It has been found, as our readers probably know, to be one of the most efficient, if not the most efficient, agent for the removal of hookworm, having been given to thousands of cases with excellent results, and if the preparation was chemically pure and the dose properly adjusted, with no ill effects.

From the toxicological standpoint it has assumed importance, because it is the active agent, if not the complete factor, in widely used preparations for cleaning clothes and removing spots from garments. The average housewife has come to rely upon it, and not infrequently places the bottle containing carbon tetrachloride in the same closet, or medicine chest, as is used to hold domestic remedies.

Recently we have met with a case in which the housewife went to such a closet, and putting the bottle to her lips swallowed a considerable quantity of this liquid before she recognized that she had picked up the wrong bottle. Without doubt serious deleterious changes in her gastrointestinal tract and particularly in the liver were avoided by her immediately drinking a large amount of water and then making herself vomit, many times, by putting her finger down her throat. After this her medical attendant very wisely made her take some levulose, and for a number of days had her take an unusually generous ration of carbohydrate food with the hope of protecting the liver against the poison.

Recently Grove, Gustafson, Maire, Thompson, Wells, and Lamson have reported exhaustive studies upon the pathological histology of carbon tetrachloride poisoning, finding, as might be supposed, that, like chloroform, its chief deleterious effect is exercised upon the liver, and that if alcohol was already in the stomach or used with the hope of bettering the patient, it caused more rapid absorption of the tetrachloride and greater destructive effect upon the liver tissues. With ordinary oils this destructive influence also seemed to be increased, or at most they did no good. When mineral oil was used, which is not absorbed, they found that little advantage accrued. It therefore remains to be discovered if any drug can be used as an antidote. This much-to-be-desired discovery has yet to be made. It is evident, however, that at the present time emptying the stomach and the avoidance of alcohol are the two points of chief interest, followed by the free administration of levulose, or some other easily absorbed carbohydrate, after the vomitus is devoid of odor of the drug. It is noteworthy that the odor of carbon tetrachloride remains upon the breath for from twenty-four to forty-eight hours, showing that it is eliminated largely by the lungs.

QUINIDINE IN AURICULAR FIBRILLATION.

We have from time to time in the Editorial or Progress columns called attention to the use of quinidine in this serious cardiac disorder. Every time a new remedy is brought forward it is apt to be received with undue enthusiasm, or at least we are encouraged to employ it with the hope that it may do more good than remedies previously employed.

Many months ago Sir Thomas Lewis stated that the value of quinidine in medicine was not so much the improvement that it would produce in patients suffering from auricular fibrillation as it was of value in aiding the cardiologist in his study of abnormal cardiac conditions.

At one time it was considered that quinidine was contraindicated after the heart had been well digitalized. Now we note that a considerable number of medical men ignore this so-called contraindication and even advise the joint administration of the two drugs.

One thing seems to be very clearly indicated, namely, that quinidine has now been used for the control of auricular fibrillation for a sufficient length of time for us to have gotten a line upon its efficiency. It

will be recalled that several writers claim that it does good in about 50 per cent of the cases, but the crucial test has been applied by a large number of men, and it would appear, certainly in the hands of the average practitioner, that it has been tried and found wanting, for any drug which we learn constantly benefits patients, hitherto practically nearly incurable, would at once have an immense popularity. We think it is fair to state that at this time its popularity is diminishing rather than increasing.

In a recent study of this subject in the *Boston Medical and Surgical Journal*, Levine and Wilmaers report upon the use of quinidine sulphate in thirty-seven hospital patients suffering from auricular fibrillation, and in one with auricular flutter, with special reference to the changes in the vital capacity of the lungs. They found no inportant changes in such vital capacity, and they conclude from this that quinidine sulphate is of no practical value in the treatment of patients with auricular fibrillation who previously have had congestive heart failure, digitalis being more satisfactory. Last of all, they assert that the use of quinidine should not become general, but should be confined to a few who may still be making careful observations as to its proper place in the treatment of heart disorders.

KAOLIN IN TOXIC CONDITIONS.

Many months ago we called attention to the employment of kaolin in very fine powder, it having been found of value in the tropics in the treatment of Asiatic cholera, the supposition being that the toxin produced by the microörganism of this disease was absorbed by the kaolin and, therefore, the patient protected. Since that time we have found relatively little literature dealing with this important subject, but in a recent issue of the *Lancet* Pope and Haines have once more called attention to the power of kaolin to absorb and have carried out certain experiments which we confess do not seem very encouraging.

Fortunately kaolin powder is an entirely innocuous substance, the more so if it is so finely divided as not to contain any lumps which may act as mechanical irritants.

The work of Pope and Haines was chiefly concerned in determining the ability of kaolin to absorb dyestuffs and other chemicals, but Eyre in the same issue of the *Lancet* reports his efforts to determine how far the absorption of toxic agents derived from bacteria infecting human beings can be prevented by the use of this substance. As a matter of fact the toxic agents which he employed can hardly be said to be a fair test for the clinical use of kaolin. He employed diphtheria toxin and found that its poisonous properties were to all intents and purposes not modified in any way. He also used the toxin derived from the bacillus of dysentery (Shiga) and again found apparently that kaolin did not have much absorptive power because the administration of kaolin and toxin to animals proved about as poisonous as the toxin by itself. As we have already indicated, these tests of kaolin can hardly be considered as the equivalent to its employment in Asiatic cholera.

With the hope of decreasing the absorbent activity of toxic material, agar-agar was added to kaolin, but this addition was practically negative in effect, the mixture being to all intents and purposes no more potent than the kaolin by itself.

These contributions which we have just quoted, therefore, have limited clinical value, but we notice them because they call attention to a subject which we believe needs further clinical investigation.

QUININE IN MALARIAL HEMATURIA.

From time to time during the last five or six years the GAZETTE has editorially called attention to certain points of importance in connection with the use of quinine in malarial fever with special reference to the times at which the drug should be used, the methods of administration, and the need for its intramuscular or intravenous injec-

tion on certain occasions. In addition to the valuable symposium on this subject in this issue of the GAZETTE the following notes are of practical interest.

There has recently appeared in a supplement of the *Indian Medical Gazette* of Calcutta a valuable article entitled "The Difficulties in the Treatment and Diagnosis of Malarial Fevers," which was read at the Calcutta School of Tropical Medicine by Brahmachari. In his experience malarial hemoglobinuria after the administration of quinine is rare, but he believes that quinine is capable of inducing this condition, detailing one case in which fatal results followed the intramuscular administration of the bihydrochloride on two successive days, a total of 14 grains being given.

A very important matter to which he gives careful attention, but which has been largely ignored by practitioners in the past, was covered by a contribution which he and his assistant Sen made to the *Biochemical Journal* in regard to the hemolytic action of quinine salts. He found that quinine hydrochloride is less hemolytic than quinine bihydrochloride; that quinine bisulphate is less hemolytic than the bihydrochloride; and that quinine sulphate is less hemolytic than either the bisulphate or quinine hydrochloride.

Again it was found in this research that quinine alkaloid itself has very little hemolytic power, and, last of all, that the hemolytic power of any salt of quinine is diminished by the addition of 10-per-cent glucose to the solution of quinine in normal saline. He believes that the hemolysis which follows the administration of the quinine salts, therefore, is due to the acid radical and not to the quinine itself, and with this idea in view he prepared a solution of quinine base which *in vitro* at least possessed no hemolytic properties, and which was made up as follows:

Quinine alkaloid	grains 5
Alcohol	minims 50
Urethane	grains 3
Calcium chloride	grains 7.5
Glucose	grains 300
Normal saline .85 per cent sodium chloride in distilled water	300 cc.

This gives a solution of quinine alkaloid of the strength of 1:600 in normal saline and 10-per-cent glucose.

It is not necessary to detail the experiments which he made with this mixture, but he claims that *in vivo* as well as *in vitro* it gives satisfactory results.

Then he comes to the question as to whether in a case of blackwater fever quinine should be administered at all if the malarial parasites are not found in the blood. Failure to find them in the blood, however, may depend upon error on the part of the observer or may be due to the fact that there are no parasites in the peripheral circulation, because they have accumulated in the internal organs. If quinine is used he advises the above solution.

Aside from its non-hemolytic action, the solution he recommends does not produce the fall in systolic blood-pressure which follows the use of the bihydrochloride, and frequently there is a rise in diastolic pressure.

There has also been some difference of opinion as to whether quinine solution should be concentrated or diluted, and Brahmachari has found that if as much as ten grains are given in twenty minims of water, a sharp fall in blood-pressure occurs, whereas if the same amount is given in about four or five drachms, some fall takes place, but this is negligible, and of course the slower the injection the less is the amount of circulatory depression, which, when it occurs, may persist for twelve hours or more. For this reason he is an earnest advocate of the use of dilute solutions and advocates 1:300 at the rate of about 2 cc each minute.

These observations are particularly important, because in malarial fever of a pernicious type the blood-pressure is sometimes very low. If this is the case, he points out that only a dilute solution should be employed, and that it should be guarded by the administration of pituitrin or adrenalin and the application of tight bandages over the extremities. This is particularly important when the patient is found in the

so-called algid stage of infection. It is best in many cases to watch the blood-pressure by the continued use of the sphygomanometer during the injection.

Last of all he firmly believes that intravenous injections of quinine ought not to be resorted to lightly, but on the other hand that in resistant cases it is probable that the intravenous injection may ultimately lead to complete sterilization.

He cites one obstinate case in which 10 grains of quinine were given intravenously on the expected days of paroxysm, three hours before the expected attack, for seven days, with the result that the patient had no recurrence of malarial manifestations for one and a half years after he left the hospital, during which time, however, he was given a second course of treatment.

It is interesting to note that this observer seems to be in doubt as to whether quinine-fast parasites really exist. Apparently he is inclined to this view.

To summarize Brahmachari's paper, we may use the author's words: "In recurring benign tertian infections, 10 grains of quinine must be given intravenously for at least seven successive days to bring about sterilization." In recurring quartan infections this also holds true, he asserts.

When these statements prove incorrect the writer believes that the explanation probably lies in failure to administer the quinine at the proper time in relation to the occurrence of sporulation.

OCULAR DEFECTS ARISING FROM SKULL INJURIES.

The various laws bearing on compensation to those injured in the course of their work, based primarily on humanitarian motives, have, while largely realizing the latter, been followed by other desirable results, not the least among them being a more intensive study of both the immediate and remote effects of injury, an increased diagnostic acumen on the part of those members of the profession brought frequently in contact with the injured, and a similar beneficent influence on the profession at large, since there are few doctors who are not called upon at times to express an opinion which bears directly upon the amount of compensation which should be received by the injured one.

The workman, the employer, and particularly the insurance companies, are vitally concerned in the just appraisement of the amount of disability following a given injury. It is unfortunately true that many claims for disability even though fraudulent are granted; it is also true that the vast majority of these claims are just, and, in the main, are recognized as so being.

Those who pay have from the first realized the importance of an immediate and skilful examination of the injured and a careful follow-up as to ultimate consequences which may be traced to such an injury. There are many ways in which a dishonest person may simulate a disability which does not exist, but which may occur in spite of the absence of demonstrable lesion. Symptoms referable to sacroiliac or back strain, or to head injuries which may be real and lasting, are occasionally so well drilled into a neurotic, ignorant and avaricious patient that they may baffle the most skilled in his efforts to determine whether they are real, imagined, or feigned. A jury is not mentally perturbed as is the specialist, since its process of reasoning is usually singularly simple and direct. It asks who has the money and who has not, and takes from him who has, and gives to him who has not.

In this relation an excellent study of the ocular defects arising from skull injuries by Somberg, Medical Examiner in Ophthalmology in the New York State Department of Labor, is timely and should be serviceable. He alludes to the frequency with which patients who have suffered from any form of skull injury complain of their eyes, as do, at times, those who have sustained traumatism to the chest, the spinal column, or the abdomen. He notes that these symptoms usually are due to functional disorders, but that there are so many patients in whom distinct and more or

less crippling lesions bearing on the eyes occur that, in a routine examination, this organ should be carefully considered. The one who first examines an injured person should determine, when this is possible, the presence or absence of ptosis, exophthalmos or enophthalmos, corneal sensibility, size, shape and reactions of the pupils, mobility of the eyes, the integrity of the extra-ocular muscles, the condition of the fundus. Moreover, it would seem wise to supplement such an examination by one designed to detect or to rule out diplopia, blind spots, scotoma, nystagmus, convergent and divergent anomalies; to determine visual acuity for distance and near, including refraction under a cycloplegic; and to inspect the fundus.

There are cases in which ocular symptoms apparently developed weeks after the injury, the effect of which on the eye could have been determined by an immediate examination. It is only when repeated examinations furnish negative findings that a case presenting symptoms can be relegated to the functional group.

Roughly about 20 to 40 per cent of serious skull injuries are immediately fatal. It is worthy of note that though fractures of the skull usually exhibit a period of unconsciousness, this injury may occur without even a transitory dazed condition following. Somberg observes that it is in such cases—*i.e.*, with slight or absent symptoms of concussion attended by fracture—that the usual sequelæ (headache and dizziness, lack of power of concentration and quick mental fatigue) persist; and moreover, in these cases, the ocular pathways are more apt to be interrupted by small hemorrhages.

The *x*-ray as a means of diagnosing fracture is not entirely satisfactory; in 25 to 30 per cent it fails to give a convincing demonstration.

There is a great difference in the individual reaction to trauma. An injury comparatively slight may be followed by the symptom reflex described as traumatic neurosis in one patient; in another following a more severe injury there may be neither immediate nor remote consequences.

Contre-coup injuries to the eye are thought to be not so rare as is generally believed. A blow to the head may be transmitted to the elastic bones of the orbit and to the globe of the eye, the force being mitigated by the surrounding orbital fat. If sufficiently severe it may detach or rupture the ocular coats.

As to ecchymosis in the lids and the deeper conjunctiva, it is noted that subconjunctival hemorrhage is more common in the absence of basilar or orbital fracture than is light ecchymosis.

Lesions of the cornea are not common. It is, however, of vital importance to test corneal sensitiveness since complete unilateral loss of this suggests a cerebellopontile angle lesion, and unless detected may be followed by a neuroparalytic keratitis with loss of the eye. Such a lesion due to hemorrhage usually recovers.

Injuries of the iris, except from direct trauma, are rare.

Pupilary changes are common and of vital importance from both the diagnostic and prognostic standpoint. Direct reaction to light and accommodation, and the consensual reaction, should be studied, since thus the diagnosis may be made between sensory and motor disturbance.

Cases of incomplete cataract formation follow injury to the side of the head. Dislocation of the lens has been noted. An apparently minor injury has been followed by choked disk, necessitating decompression; this incident to infection rather than to the direct pressure of a hemorrhage which has been stopped. Glaucoma is never primarily caused by skull injury, though an acute attack of it may be precipitated in one exhibiting a predisposition. Orbital contusions should always excite apprehension concerning the function of the eye. If the loss of function be gradual hemorrhage and pressure are the probable cause, and, on absorption, there should be return of function.

As to the functional defects usually associated with traumatic neuroses, amblyopia is their most striking expression, occurring with usually dilated pupils but normal re-

actions. In these cases there is a good prognosis.

In regard to post-traumatic disturbance of accommodation, asthenopia is perhaps the usual expression of this, as is vertigo referred by the patient to his eyes and aggravated by movements of the head.

It is evident that following all head injuries a skilled ophthalmological examination is indicated, not only from the standpoint of compensation, but from that of conservation.

TREATMENT OF ACUTE PERITONITIS.

It is generally recognized that the peritoneum, at one time regarded as the most vulnerable tissue of the body and the one least able to defend itself against bacterial invasion, is, if untraumatized, extraordinarily well able to care for itself, and that, in the absence of a massive and overwhelming bacterial invasion, its defensive powers are usually adequate, especially so when helped by wise surgery. When the invasion is rapid and progressive, as, for instance, in the case of a ruptured appendix, infected fallopian tube or gall-bladder, acute necrotic pancreatitis, or ulcerative or traumatic perforation of the gastrointestinal tract, the spread of an overwhelming infection is usually more rapid than are the processes of a limiting resistance and repair.

Under these circumstances, and such are the usual conditions in acute peritonitis, the first step toward the insuring of recovery is, by prompt operation, the removal or stoppage of the cause; and thereafter a scrupulous respect for peritoneal surfaces. When there is a wide involvement and considerable fluid in the peritoneal cavity, and particularly if this be assuredly infected, as is usually the case in perforating ulcer, the Fowler position and drainage of Douglas's pouch are indicated—the Fowler position because only thus can fluid be made to gravitate into the pelvic region. The Fowler position can only be effective when the entire trunk is raised from the horizontal position to an angle of at least 45 degrees. Unless provision is made by which the patient is prevented from slipping down, this position will resolve itself into one of least comfort to the patient, and indeed a positive harm, since he will necessarily so gravitate that his shoulders and head only are elevated, with resultant marked interference to his breathing, usually already sufficiently embarrassed by abdominal distention. The proper position may be maintained by tilting up the mattress from the buttocks to the bend of the knees at such an angle that slipping is impossible.

Jeans (*Lancet*, April 4, 1925), writing briefly on this subject, notes that in the last twenty years the mortality of general peritonitis has been reduced from over 80 to less than 20 per cent. He attributes this reduction to prompt and swift operation, suprapubic drainage in the Fowler position, and the giving of salines. As to the value of the first two procedures there can be no dispute. The opinion expressed as to salines will not meet with general approval on the part of surgeons. Jean states that he always gives 3 grains of calomel twenty-four hours after operation, repeating it if the patient vomits, followed in rapid succession by mist. alb., a turpentine enema, pituitary extract, and eserine. The two latter seem to act on different types of cases. Jeans thus suggests the treatment of another time, to wit, when the mortality from acute general peritonitis was almost absolute and the process of dying one of prolonged agony unrelieved by anodyne. The general custom was to give a saturated solution of Epsom salts at frequent intervals until the patient defecated or perished. The accepted theory now is to the effect that in the presence of acute inflammation rest is indicated. That active peristalsis during this acute period is undesirable. That Nature indicates this by the partial or sometimes complete intestinal paresis which accompanies inflammation of the peritoneal coating of the bowels. That purgatives, deadly before the removal of the underlying cause, are undesirable for two or three days after the cause has been removed. That the pain

and distress should be relieved by morphine given in adequate doses, that elimination is of vital importance, and that therefore the system should be flooded with fluid by hypodermoclysis, by enteroclysis, and by venoclysis if needful.

When the time for establishing peristalsis, sometimes three, four, or five days, has come the end is best attained by enemata and, if there be great distention, the administration of pituitrin. Until peristalsis is established all food is withheld. Water is given freely if it can be retained. It will be remembered that water with dilute alcohol is absorbed directly from the stomach; the water itself is not. If the patient needs calories these are given in the form of glucose; intravenously if the need be great and urgent, but always a chemically pure preparation; by the bowel if it be retained and if the immediate call be not so imperative.

Progress in Therapeutics

Medical Therapeutics

A General Survey of Radiotherapy in Malignant Disease.

In the *British Medical Journal* of March, 28, 1925, SCOTT reminds us that radiation does not destroy or remove unwanted cells as does the cautery or knife. Profound changes are set up which allow them to be absorbed and replaced by healthy cells. This is important to remember, for it means that malignant cells can be made to undergo a change, resulting in their replacement by normal tissues, without necrosis taking place—in short, a metamorphosis without cellular death.

It is clear, therefore, that tissue reaction plays an important part. If, for some unknown reason, this reaction fails, no amount of radiation will succeed in destroying the pathological cells. It is thus evident that there is a local indirect effect of radiation; carried further, is it not possible to create it on a larger scale generally, calling up all nature's forces to assist in the cure? In other words, may it not be possible by radiating a large area to set free in the body some antitoxin or enzyme that will assist in the desired destruction? The work of many physicists supports this theory. He has himself on several occasions seen lymphosarcomatous glands in unradiated parts disappear after large areas have been irradiated. In one case this was manifested in half an hour! He asks: "Is radiation sickness evidence of the liberation of something of the nature of an antitoxin?" And he thinks he has said enough to indicate a line for future research.

Uniform dosage for all the various forms of carcinoma or all varieties of sarcoma cannot be entertained. The results may be dependent, not only on the direct effect of radiation, but on some as yet unknown indirect phenomena. Experimental data are rapidly accumulating, indicating that the occurrence and nature of immunity to cancer is a field of study from which we may expect much in the near future.

We medical men should not be accused of treating the human body as if it were merely so many cubic centimeters of material. We are all conscious of the so-called "personal element"—that tantalizing something—present, but not yet measurable. A patient for radiation should not only be thoroughly investigated physically, but his age, state of health, and so on, must be taken into consideration before deciding whether radiation will achieve anything beneficial to him.

Radiation being decided upon, the next point is to map out clearly the lines of treatment to be adopted. These may be pallia-

tive or curative. Of the patients seen by radiologists, in the majority palliation only is all that can be hoped for. This side of radiotherapy is of great value, but is being lost sight of in our efforts to cure. It is quite impossible, in certain cases, to attempt to eradicate the disease, and the chances are that if we do not discriminate the last condition of the patient will be worse than the first. The therapeutic goal varies, and each case must become a study in itself. He makes it a rule to put down the objects he hopes to achieve by radiation, and his plan of treatment is arranged accordingly.

Radiation sickness is the bugbear of radiation. We have to inquire what its cause is, and whether it should be regarded as evidence of overdosage. The results are often disastrous to the patient, being sufficient to turn the scale against him. This puzzling phenomenon may manifest itself in several ways. Actual vomiting may occur as the patient is undergoing treatment, or sudden nausea with or without vomiting may be experienced from one to seventy-two hours after. Intense headache may be complained of without gastric symptoms. With the high-voltage line of treatment vomiting may become uncontrollable. In its treatment various drugs have been advocated from time to time, but so far he has found nothing to control it. At present he does not consider that we are justified in subjecting a patient to the risk of severe radiation sickness unless we can promise him something substantial in return.

The majority of cases that find their way to the radiological department of the London Hospital, and probably at most of the hospitals in England, come under the heading of carcinoma mammæ. Over two thousand have been treated at the London Hospital in the last fourteen years. For this reason Scott has always endeavored to improve the technique for this large class of cases. Whether inoperable, recurrent, or requiring prophylactic treatment, malignant disease of the breast illustrates very clearly the problem we have to solve in radiation of cancer.

After the primary growth has been removed, not by radiation, but by the surgeon, the radiologist is called in. His interest now is not distracted by the presence of a tumor; he has to devise a technique that has a reasonable chance of destroying cells at unknown depths and positions. This is a complex problem, but it must be faced. The surgeon can, in a number of cases, remove the primary growth and glands without help, but he is not satisfied with the results because he does not necessarily prevent metastases or recurrence. This, then, is where the radiologist can help. Even if it were possible to destroy with certainty every primary growth by radiation or any other method, he personally would not be satisfied. Metastases kill the patient just as rapidly. We must control these in addition to the original cancer.

He considers heterogeneous radiation to be of greater therapeutic value than homogeneous in the prophylactic treatment of breast cancer, for these reasons: It gives radiation absorption at various depths; a large radiation field can be utilized with minimum general disturbance. He grants that further development is required on these lines. He has already reached the limit of the toleration of the patient under these conditions.

There are four chief objections to the high-voltage method in this class of cases:

1. The radiation field is necessarily much too limited.

2. There is no indication as to the depth at which the dose should be delivered.

3. Damage to the lung tissue is comparatively frequent.

4. General disturbances—such as sickness and blood changes—place too great a strain on the patient.

The response of many a hopeless case is often remarkable if the heterogeneous radiation is carefully carried out.

Scott maintains that whatever form of radiation is used in cases of breast carcinoma, it is useless and against common sense to limit it to local areas. Radiation should, if possible, include the whole trunk.

It benefits the patient but little to check the metastases in a localized area while they go ahead elsewhere. As there is no evidence for the theory that in many cases the patient's tissues—we do not know which—have the ability of producing some beneficial reaction, the larger the field of radiation the better.

As a preliminary effort toward achieving the conditions he considers necessary in the treatment of these cases, he introduced the dual open method at the London Hospital some three years ago. Briefly stated, it consists in placing a tube at the back and front of the patient, both running at the same time, the radiation field including practically the whole trunk. The results show, without doubt, that this arrangement has greatly increased the range of control, being now obtained in cases previously out of reach, such as secondary deposits in the spine. This is all to the good, but much research is necessary before any further advance can be expected. To his mind this is certainly a logical method of radiation, where stray pathological cells may be at unknown depths and positions. It must be realized that attempts to substitute physics for biology and medicine can only hinder sound progress in radiotherapy.

Nocturia and Its Treatment.

In the *Medical Times* for April, 1925, PORTERFIELD presents a method of treatment which he believes may not be familiar to every one, but which in his hands has brought him more thanks from patients than almost any simple procedure he has ever carried out. One of the trying experiences in men above middle age with prostatic hypertrophy is the disturbed rest and loss of sleep due to the necessity of frequent micturition at night.

For the past ten years he has made it a routine practice to give these patients a chocolate-coated four-grain tablet of chromium sulphate, which can be easily obtained at any wholesale drug house. He has never yet given it to any of this class of patients who have not been greatly benefited. In many instances the getting up nights has been avoided entirely. It should be given for considerable periods such as from two to six months, one tablet four times daily. Following marked improvement the drug can be continued in a desultory way, one or two daily, or omitted entirely for a few weeks and then begun again. He does not know the "how" of it, but he claims that it works.

An Attempt to Classify, by Means of the X-ray, Cases of Suspected and Definite Pulmonary Tuberculosis Showing Less Than a Definite Parenchymatous X-ray Lesion.

In the *Fortieth Annual Medical Report of the Trudeau Sanatorium* for 1924, HEISE and SAMPSON state that the number of cases in each group considered is far too small to draw any definite conclusions. Nevertheless, it is noteworthy that no deaths occurred from pulmonary tuberculosis except in the probable parenchymatous group. One patient dying of tuberculous peritonitis, in all probability, had a pulmonary tuberculosis at the time of the pleurisy with effusion.

Although a patient may have had an hemoptysis or a pleuritic effusion, or a history of positive sputum, or râles, and the *x*-ray does not show a characteristic tuberculous parenchymatous lesion, the prognosis seems to be quite good, since only 1.7 per cent of 121 such cases have died of tuberculosis within four years.

Vaccination.

In *Health News,* issued by the United States Public Health Service, Surgeon-General Cumming issues a warning against the use of bunion pads or other improper dressing in vaccination. He says this singular use of bunion pads appears to be more common than would be supposed. Several fatal cases of tetanus, following their use, have recently appeared in the

United States, and tests made by the Hygienic Laboratory of the Public Health Service have demonstrated the presence of tetanus spores in bunion pads from the same source as those which were associated with tetanus cases.

"The Public Health Service deplores the use of any kind of shield as a vaccination dressing. The employment of a shield tends to prevent evaporation, to retain heat, moisture, or discharges, with a consequent softening of the vesicle, to obstruct lymphatic drainage, and to create conditions apparently favorable for the development of infection."

He adds that the cross-scarification method of vaccination, which was formerly common and which is still adhered to by some, is dangerous. He recommends that if an incision is made for the purpose of vaccinating, it should not draw blood, if possible to avoid this, and that it should not be more than one-eighth of an inch in length. If two such incisions are made, they should be one inch apart. If they are placed closer together than one inch they are very likely to coalesce. If vaccination is done by the method of making a small abrasion, such as may be done with a specially prepared instrument, this should not be more than one-sixteenth of an inch in diameter, and if two such abrasions are made, they should be one inch apart.

Lastly he points out the fact that since 1900 six million persons have been vaccinated by the physicians of the army and the navy without a single case of tetanus having occurred.

Radium Therapy.

In an editorial on this subject the *Lancet* of April 4, 1925, states that the rationale of radium therapy is based upon the fact that the radium irradiation properly administered upon any living cell produces certain effects, occurring in three phases, namely, increase of cell activity, arrest of cell growth, and degeneration and destruction of the cell. But this fact is supplemented by another, namely, that pathological cells and normal cells respond differently to the action of radium rays, the three phases of transformation being distorted, so that proliferation is more rapidly brought about, activity is more quickly arrested, and degeneration occurs more rapidly. On this point, Sidney Russ, discussing the selective action of the rays in passing through the tissues of the body, has said that the rays exert some degree of selective action upon malignant and normal tissues, it being more than probable that the series of events following irradiation is determined somewhat by the interplay of forces between them. He finds, in fact, "the sequel to tumor irradiation depends not only on the dose which it has received, but on the nature and extent of the reaction of the normal tissues of the host."

The chief importance, then, in the treatment of malignant disease by radium is to kill malignant cells with as little damage to the healthy cells of the body as possible, and the main problem of radium therapy is correctly to estimate the dosage and exposure necessary to bring about the death of the pathological cells without damaging normal cells beyond the point of satisfactory repair. Insufficient dosage may bring about only a quick stimulus of what it is proposed to destroy. Too heavy dosage may produce the destruction of what it is necessary to conserve. Hayward Pinch, speaking in very general terms of the fundamental principles of radium therapy in dealing with a malignant growth, advises that every effort should be made to secure as uniform a radiation as possible to all parts of the growth, and consideres that it is best to give a maximum dose at the first exposure.

In his brochure he takes up the use of radium in diseases of the alimentary canal and its accessory glands, the thyroid, thymus, and spleen, and the lympthatic system, with chapters on the results in diseases of the breast, and in gynecology, urology, dermatology, ophthalmology, laryngology, and rhinology or otology generally. Radium in internal medicine is briefly considered, and the clinical aspects of the work of the

research department between May, 1919, and December, 1924, are summarized by J. C. Mottram, Director of the Pathological Laboratory. An appendix is added by W. S. Alton, the Director of the Chemical and Physical Laboratory of the Radium Institute of London, which deals with the evolution of the present-day technique of preparing radium and radon applicators. This is particularly timely, as a misconception has been disseminated with respect to radium emanation, probably due to the fact that only comparatively recently the term radon has been adopted in accordance with a suggestion made in 1923 by an international committee on chemical elements. The technique of the radium emanation treatment has, no doubt, been modified, but, as Pinch points out, the method has been employed almost since the opening of the Institute, as will be seen by the details supplied in the report of the Institute for 1912. Since this time radium emanation tubes have been placed with increasing frequency in proper hands by the Institute, a procedure which also is followed at the Manchester and District Radium Institute under the supervision of their radiologist.

The general conclusion of Alton is that there is no distinction to be made in their therapeutic uses between radium and radium emanation, reference being made to a chart, included in the Clinical Index of Radium Therapy, to show that they are successive members in the disintegration series of the same parent body. Employment of one or the other can, therefore, be dictated by the various circumstances of the case.

Intracarotid Route in the Treatment of General Paresis.

In the *Boston Medical and Surgical Journal* of April 9, 1925, HIRSCH, MYERSON and HALLORAN state that intracarotid injection is safe in proper hands. It is feasible and can be utilized indefinitely without injury to the artery and without untoward signs systemically; as compared with intravenous injection, however, it is more difficult, and on account of the proximity of many important structures it must be regarded as a major procedure.

Their series is too small to draw conclusions regarding present or future results. It is of some significance, however, that none of these cases has grown worse under treatment, although some of them were deteriorating at the time that intracarotid treatment was started.

Improvement has been recorded in some cases, and they think there is every reason to feel that the procedure is warranted and should be tried in a much larger series of cases.

A Study of Three Hundred Cases of Asthma and Other Forms of Allergy.

In the *Annals of Clinical Medicine* for April, 1925, LINTZ states that asthma, hayfever, angioneurotic edema, etc., usually occur in combination in the same individual, and are only manifestations or symptoms of an underlying disease called allergy.

Frequency in urination, certain forms of severe headache and arthritis may be allergic manifestations.

Disturbances of the endocrine glands and an unstable autonomic nervous system are conspicuous symptoms in allergy.

Puberty seems to affect the male child favorably and the female child unfavorably.

Menstruation in general has an unfavorable influence on allergy.

Menopause on the whole effects allergy unfavorably.

Height and the pituitary glands are not factors in allergy.

The female allergic is apt to be more overweight than the male; the male allergic child has a tendency to overweight.

The blood-pressure was conspicuous by an increase in pulse-pressure and its fluctuating character. As the patient improved the blood-pressure approached normal when either too high or too low.

The pulse was more often slow than rapid. It was conspicuous by its fluctuating character.

The vital capacity was decreased mark-

edly during the asthmatic attacks. On the whole it was decreased to a less extent in the average case during the interval.

There is a great preponderance of respiratory diseases in the past history of these patients. Many of these patients date back the onset of their asthmatic attacks from a respiratory infection.

Pregnancy as a rule influences bronchial asthma unfavorably.

Allergic patients frequently menstruate while lactating.

Hematuria may be of allergic origin.

Blood may be found in sputum, feces, and gastric contents of asthma and hayfever patients.

Gastrointestinal allergy is quite frequently mistaken for chronic appendicitis and a useless appendectomy is performed.

He found calcium iodide t. i. d., saturated solution in drachm doses, to be the best drug for asthma and other forms of allergy, when given during interval.

Chronic Nasal Sinus Inflammation.

Writing in the *Practitioner* for April, 1925, HARRISON insists that amongst the symptoms from which many patients, who make no complaint of nasal symptoms, suffer, headache is the commonest, and headaches caused by some nasal abnormality are much commoner than is generally supposed. As Hajek says, many cases of sinus disease with slight nasal symptoms go through their lives with the diagnosis of chronic headache without its occurring to anybody that the headache may be caused by disease in the nasal sinuses.

The headache may be present every day or only intermittently. Generally it is present for some hours each day, oftenest appearing in the morning, and is increased by bending over, straining, or mental work. Indigestible food, alcohol, and tobacco increase its severity, which often does not bear any relationship to the severity of the disease. Some cases with very marked disease make little or no complaint, while others with little manifest disease suffer very severely. The headache of frontal sinus and antral disease is generally in the frontal region. Ethmoidal disease produces headache at the vertex or pain between the eyes. The headache of sphenoidal trouble is sometimes occipital, sometimes at the vertex, and at other times in the temporoparietal region. In a number of cases the headache is worse on the affected side or confined to that side. There are a number of ways in which it is produced, such as:

1. Swelling of the mucous membrane with pressure on or irritation of the nerves.

2. Swollen mucous surfaces coming into contact and pressing against each other.

3. Stasis following obstruction to drainage. The swollen mucous membrane around the opening of the sinus blocks the exit of the pus, which gradually accumulates and remains under tension until this can overcome the obstruction. In these cases the headache, which may be at first slight, increases in severity until the discharge takes place, when it rapidly disappears until the pus again accumulates.

4. Absorption of toxins formed in the sinus.

5. Disturbance of the lymph and blood circulation at the base of the brain.

In many cases the headache is brought about by the pressure on the septum and outer wall of the nose of an enlarged middle turbinate. A lady consulted him recently, giving a history of constant headache for nearly two years. It was not severe, as a general rule, but made her feel dull and heavy. She had lost her sense of smell, and she could not taste things properly. She had occasionally a free discharge of watery fluid. Both middle turbinates were large, pressing on her septum, and blocking her olfactory fissure. The greater part of both middle turbinates was removed, and six months later she reported that she had not had a headache since, and was able to smell and taste well.

Yankhaur calls attention to a point which is valuable in diagnosis. Inhalations of steam will shrink the mucous membrane, stimulate the ciliated epithelium, and promote drainage. If a patient suffering from recurrent headache has even temporary or

partial relief from this treatment the headache is of nasal origin.

Applications of cocaine and adrenalin to the nasal mucous membrane will relieve nasal headache.

The Value of Pituitrin in Labor.

In the *Practitioner* for April, 1925, MURPHY cites two abnormal cases of parturition, both patients being located in remote villages on the seacoast. No trained assistance was available, and pituitary extract obviated in both cases the necessity of administering an anesthetic.

The first case was a primapara at full term. It was thirty-six hours since labor set in, and on examination he found the os rigid, and a slow oozing hemorrhage. The lower uterine segment was markedly cone-shaped, with partial placenta prævia. He injected 1 cc of pituitrin deep into the buttocks, and in a few minutes the hemorrhage ceased; in one hour and twenty minutes the cervix completely retracted, and the os dilated so well that the forceps delivery was quite a simple procedure. No further hemorrhage took place and there was no placental trouble.

The second case was a four-para at full time; the history elicited was that the pains started after the patient had retired to bed in the early part of the night. On examination he found coils of a prolapsed cord in the vagina, complicated with a breech presentation. Pulsations were strong in the prolapsed cord. The mother showing no symptoms of fatigue, he temporized for some hours. He made no effort to replace the cord, his experience in these cases being that it usually came down again a lot quicker than the time taken to replace it, nor, indeed, would the undilated state of the os allow him to do so. He cleared out the rectum with an enema, and after waiting for three and a quarter hours he found the os soft and yielding. He then injected 1 cc of pituitrin, and the pains that were scarcely perceptible before set in vigorously; in ten minutes the child's buttocks were dilating fully the vulval outlet. He gave no assistance whatsoever, with the exception of raising the infant's buttocks off the bed to bring the body in a direct line with the pelvic curve. The woman delivered herself, the after-coming head gliding clear of the pubic arch. Lifting up the child's trunk toward the mother's umbilicus released the head from the vagina, and after a few slight smacks the infant cried out. There was no after hemorrhage, and no trouble with the placenta.

The Value of the Trudeau Sanatorium's Five Diagnostic Criteria of Pulmonary Tuberculosis in Negative Diagnoses.

In the *Fortieth Annual Medical Report of the Trudeau Sanatorium* for 1924, BROWN and HEISE state that it must always be borne in mind that definite clinical pulmonary tuberculosis may develop at any time in a certain number of subliminal cases.

It is unwise to accept from one year to another a negative diagnosis of clinical pulmonary tuberculosis, although in these cases the percentage is so small as to be almost negligible.

A patient who fails to react to a repeated dose of 10 mgm. of old tuberculin rarely, if ever, develops active clinical pulmonary tuberculosis.

When all of the five suggested diagnostic criteria are absent a negative diagnosis of clinical pulmonary tuberculosis can be safely made.

Intraperitonal Transfusion with Citrated Blood.

In the *American Journal of Diseases of Children* for April, 1925, SIPERSTEIN says that he wishes to emphasize that the introduction of citrated blood into the abdominal cavity must be regarded as a true transfusion. The comparatively rapid rise in hemoglobin and in red cell count cannot be due to a stimulation of the bone-marrow. Stimulation of the bone-marrow never shows such a rapid response. Nucleated

red blood cells, polychromatophilia and other evidences of bone-marrow activity are absent following abdominal transfusion.

Clinical improvement obviously depends on the rate of absorption, which is variable. The basic factors involved are still unknown. He has found blood present in the peritoneal cavity many days after its injection. On the other hand, he has seen the peritoneal cavity free from any evidence of blood within from twelve to fifteen hours. Physiologic processes of obscure origin may be the cause.

With the proper preliminary technique, the presence of free citrated blood in this serous cavity is entirely without danger. The clinical experiences of many investigators apparently justify this conclusion. Reports of peritonitis and injured viscera following abdominal puncture occasionally appear in the literature. These are due, for the most part, to faulty technique. No harmful effect attributable to the citrated blood itself has ever occurred.

In conclusion, it should be stated that the intraperitoneal transfusion of citrated blood should be regarded only as a substitute for a direct intravenous transfusion. The latter is always the method of choice. The attendant circumstances and the skill of the physicians are the deciding factors. In cases in which transfusion is indicated and other routes are unavailable or impractical, the intraperitoneal method may be employed. The harmlessness and the simplicity of technique makes this procedure advisable. The clinical results obtained make it practicable.

Radium in Gynecology.

In the *Journal of the Missouri State Medical Association* for April, 1925, GELLHORN reminds us that until a few years ago the treatment of fibroids was exclusively surgical. Once the diagnosis of fibroid was made, an operation was clearly indicated. It was then found—and has since been established beyond a doubt—that radium, if applied properly, will check the bleeding in practically every case and will cause a more or less complete shrinkage of the tumor in 80 or more per cent. These results are brought about in three ways. To begin with, the radium rays exert a deleterious effect upon the follicle cells in the ovaries. This means that the follicles no longer ripen but undergo degeneration. No new ova are formed, and where there is no ovulation there can be no menstruation. The condition, therefore, is one of artificial menopause and has, not inappropriately, been termed a bloodless castration. Secondly, the radium rays influence the tumor cells directly in such a way that the nuclei degenerate and the cell bodies pass through a sort of autolytic process which probably bears some resemblance to involution after childbirth. Finally, the radium, if inserted into the uterine cavity, causes a burn of the endometrium and thereby seals up the source of bleeding.

What makes these effects still more attractive is the fact that radium carries with it no mortality (as compared with a death toll, on an average, of about 5 per cent from surgery), very little morbidity, and certain economic advantages such as moderate expense, uninterrupted ability to work, etc.

In spite of all these gratifying results and circumstances, it would, however, be a mistake to assume that surgery has no longer a place in the treatment of fibroids, and to apply radium in every case. For not only are there cases in which radium produces no effect, but there are also others in which its use has distinct disadvantages. The practitioner, therefore, should have some idea about the proper selection of cases for one or the other form of treatment.

Generally speaking, women of forty or over with fibroids of small or moderately large size—let us say, extending not higher than to the umbilicus—are the best subjects for radium treatment; and it will occur at once that, proportionately, this is the category of cases one sees most frequently. Then there are the patients "of poor surgical risk" who, irrespective of age, do better under radium—the anemic and exsanguinated kind (again a relatively large cate-

gory), those with high blood-pressure or cardiac and renal complications, the women with pulmonary tuberculosis and other respiratory ailments, and, finally, the obese, whom no surgeon likes. Add to these two classes of patients the women who will not submit to an operation under any conditions, and you have a rather large percentage of cases—he would say around 60 per cent of all fibroids—that may successfully be treated with radium.

The remaining 40 per cent must now, as before, be subjected to operation. These are, first, the younger women in the second and third decades of life, because we may be able to preserve the uterus for menstruation and possible pregnancy or, at least, the ovaries to ward off the hardships of premature menopause. Second, we want to operate on all gigantic fibroids and the large pedunculated ones, particularly those of the submucous variety, because in both of these radium is apt to produce necrosis; and for the same reason degenerated fibroids (suppurating, gangrenous, cystic) are unsuited for radium and should be attacked surgically. Cervical fibroids require operation because they do not respond at all to radiation. Complicating tubo-ovarian inflammation likewise calls for operation, as radium is apt to make the infection flare up. Last, but not least, in an uncertain diagnosis the operation is far preferable, and if there is the least doubt whether the tumor in question is really a fibroid, the practitioner would do well to have a gynecological consultation before assigning the patient to radium treatment.

The Use and Abuse of Drugs.

In an editorial on this subject, the *Lancet* of April 4, 1925, points out that in the middle of the last century the doctrine of therapeutic nihilism found its chief exponent in Josef Skoda, a leader of a new school of thought in Vienna, who declared that while we can diagnose and describe disease we dare not expect by any means to cure it. In this country up to the present day the influence of that doctrine persists—diagnosis is taught in our medical schools as the essential equipment of the young practitioner, and the student hears too often that a physician must be judged, not only by the success of his treatment, but by the extent of his knowledge, medicine as the art of healing the sick giving place to medicine as the study, *per se*, of the disease. But the tide of opinion is turning against therapeutic nihilism, and Dixon, at a meeting of the Hunterian Society on March 30, stated, as one of the reasons which have altered our views on the action of drugs, that we have now learned that the body itself works by means of drugs of its own manufacture. It manufactures alkaloids, just as plants do, for its own needs. In emergencies our internal secretions may provide us with drugs required for our well-being—in rage or fear a rush of adrenalin will produce the conditions required for fight or flight.

Chemotherapy is also opening up a new outlook in medicine with regard to specificity, and, while increasing specificity in pharmacology widens the field of successful treatment of disease, it also increases the possibilities of the abuse of drugs. It is a difficult matter to draw the line between use and abuse of a drug. For example, quinine is a specific for malaria, but its use to treat a cold may be classed as an abuse, so long as there is no definite organism susceptible to quinine and etiologically connected with the cold.

Dale, speaking at the same meeting, defined the abuse of drugs as their reckless and unintelligent use. Intelligent use of a drug, he explained, does not mean that the practitioner must have a full scientific appreciation of a drug's action; were that necessary many valuable drugs would be discarded. But it is essential to make close and accurate clinical observations, and not to rely on vague impressions and rule-of-thumb restrictions. Enlightened empiricism he described as being often a better procedure than basing treatment on a supposedly scientific foundation. Much is now being published both by scientific and lay writers concerning the rationale of the ac-

tion of certain pharmaceutical products, and it is couched in scientific or pseudo-scientific terms whose main characteristic is extreme plausibility.

Many of these "scientific" explanations contained in pharmacological "literature" Dale considered to be dangerous, the danger lying, in his opinion, in the excessive modesty of the medicial profession, who were inclined to look on what they could not quite understand as being very deep and possibly very true. It was impossible, he pointed out, for any one to know more than his own corner of the scientific world, and such an attitude of accessibility to mysterious dicta coming from another corner was to be deprecated. As an instance of this Dale quoted several statements that had been made on the one hand with perfectly genuine intent by a leader of the medical profession with regard to the value of colloidal substances, and on the other by a firm of commercial chemists, perhaps not so ingenuously; but both sets of utterances were entirely misleading. It was time, he said, that something was done to rescue what might be valuable in treatment from what might be manifest abuse, but the difficulties in differentiation are considerable. This should not, however, cause them to be held insuperable.

Intramuscular Use of Ether in Pertussis.

In the *American Journal of Diseases of Children* for April, 1925, Tow states that twenty-two per cent, or fifty out of sixty-one children suffering from whooping-cough, were aided by the use of ether intramuscularly. The ages varied from twenty days to seven years. The number of paroxysms was reduced and their severity lessened; the patients slept better; their appetite improved, and vomiting also was lessened.

Eight per cent, or eleven, were not aided.

Two adults and seventeen children are not included in his series because they were not under observation long enough. One of the adults had four injections, with an excellent result.

Seven out of eighty patients, or 9 per cent of the total number, had necrotic areas at the site of the injection. Six of these had one area, and one patient had two small patches. In only two instances were the local reactions severe.

Eight out of 385, or 2 per cent of the total number of injections, were complicated by necrosis.

Ether intramuscularly is a valuable drug in the treatment of pertussis.

Tow admits that the use of ether intramuscularly is not without danger of necrosis.

A Simple Immediate Treatment for Postoperative Vomiting.

In the *Journal of the American Medical Association* of April 25, 1925, LEHMAN and GIBSON state that sodium chloride solution, 2 per cent, was observed in an earlier study to set up active forward peristalsis in a patient suffering from a complete high intestinal fistula.

Clinically, cases of reversal of peristalsis, with nausea and vomiting, all improved following the administration of 2 per cent sodium chloride solution, and they suggest that this observation may be of value in nausea and vomiting from many other causes.

They express the belief that the treatment is so simple and harmless that it deserves a trial by clinicians everywhere, with a view to confirming or disproving the present observations.

Action of Digitalis in the Presence of Coronary Obstruction.

GOLD in the *Archives of Internal Medicine* for April, 1925, tells us that more than fifty experiments have been performed on the cat to determine whether coronary occlusion changes the tolerance of an animal to the toxic action of the digitalis bodies.

Evidence is cited which shows that theoretic generalizations in connection with the response to digitalis in disturbances of the cardiac mechanism, or in conditions

leading to such disturbances, are not justified.

Effects of occlusion of different parts of the coronary circulation vary widely, depending on the differences in the compensatory circulation. No constantly occurring irregularities were observed after ligation of any particular branch of the coronary vessels.

The failure of the portion of the heart deprived of blood to fibrillate is probably due to an area of block confining the circus movement to the remaining portion of the heart. The failure of the fibrillation to persist after ligation of a large coronary vessel is probably due to the diminished tissue mass involved in the fibrillation.

A heart that has been in ventricular fibrillation from coronary occlusion and has recovered temporarily also shows no diminished tolerance to the toxic action of digitalis (ouabain).

The average fatal dose of digitalis (ouabain) for seventeen animals with varying degrees of coronary obstruction was the same as that for normal animals. The experimental data, therefore, lend no support to the fear that in the presence of coronary occlusion digitalis may precipitate ventricular fibrillation more readily than in the normal heart.

[Ouabain is of course not the actual equivalent of digitalis as is indicated by the author of this paper.—ED.]

Cereal Foods as a Factor in Rickets.

In an editorial on this subject, the *British Medical Journal* of April 11, 1925, tells us that the Medical Research Council has just issued a report by Mellanby on the effect of cereals and their interaction with other factors of diet and environment in producing rickets, in which he describes experiments made with the object of developing this aspect of the problem of rickets. As he observes in his introduction, probably in no physiological activity so far studied do action and reaction of dietetic elements stand out more prominently than in the growth and hardening of bone.

This research proves that the various common cereals—oatmeal, whole-meal flour, white flour, rice, barley, etc.—have different effects on the growing animal, and that such differences cannot as yet be explained on the basis of their known constituents. Evidence is brought forward showing that some cereals and cereal products have a strongly adverse influence on bone calcification, and that this varies, not only with the amount and type of the particular cereal eaten, but with the general make-up of the diet. The "cereal action" can be completely antagonized by the antirachitic vitamin, especially by cod-liver oil, and to some extent also by exposing either the animal or the cereal food to ultraviolet radiations.

Many of the experimental results detailed in the present report have already been described by the author when making communications to various scientific bodies; for example, in the Oliver-Sharpey Lectures before the Royal College of Physicians in 1922, and in his paper read to a joint meeting of the Sections of Physiology and Diseases of Children at the Glasgow meeting of the British Medical Association in the same year, when opening a discussion on the etiology of rickets. Since then he has endeavored to follow the sequence of events, and more especially to find the substance or substances in cereals which under some conditions interfere with the calcification of bone and the proper functioning of other tissues. The task, he says, has proved more difficult than he supposed, for its solution does not appear to depend, as seemed at first likely, upon some well-recognized dietetic factor or factors. Although the research is still incomplete, he reports progress at the present stage for three reasons. One is the practical importance in dietetics of the facts so far observed; the second is because they put into better perspective the significance of the phosphorus and calcium elements of the diet in the etiology of rickets; the third is the emphasis they give to the great importance of balance in dietary constituents. On this last point he writes of the constant battle going on among dietetic elements as

regards the calcification of bone, some substances stimulating and others preventing the process; and the ultimate structure of the bone is the outcome of the conflict.

Most of the experiments recorded were carried out at the Field Laboratory, Sheffield University, in which the conditions were more uniform than those at Cambridge, where much of the earlier work was done. Mellanby first gives an account of experiments demonstrating the relative rickets-producing effect of different cereals, and then describes some of the attempts made to discover the cause of these differences. Later, he marshals the evidence showing that this cereal effect can be modified in varying degree, not only by other constituents of the diet, but also by ultraviolet radiations.

With a diet deficient in antirachitic vitamin, increasing the amount of cereal brings about worse-formed bones if other factors of diet and environment remain constant. Of the different cereals examined, oatmeal, contrary to what might be supposed, has by far the worst influence on bone formation. Next come maize and barley, rice and wheaten flour, the last having the least harmful effect. The germ of wheaten flour, if enough is added, also interferes with bone calcification.

Of the foodstuffs containing the antirachitic vitamin which antagonizes "cereal action," cod-liver oil is by far the most effective, and quite small quantities suffice. Whole milk in fairly large amount, and egg-yolk, are also potent antagonists; but butter, unless accompanied by a fairly high calcium intake, is of comparatively small value. Both calcium carbonate and calcium phosphate work well in conjunction with the vitamin of butter fat. The antirachitic effect of separated milk is more potent than can be accounted for by its calcium content alone. Even when the diet is greatly deficient in antirachitic vitamin the development of rickets is hindered to some extent by increasing the calcium content, preferably by addition of the carbonate.

In conclusion, Mellanby touches briefly on two practical points of dietetics which arise out of the experimental findings set out in this report. One is the question, Why, if oatmeal is so detrimental to bone formation, fine races of men have been reared on diets of which this cereal forms a large part? The other is, What is the bearing of these experiments upon the wholemeal versus white bread controversy? In answer to the first question, the author suggests that the diet of the oatmeal-eating people has also included much of foods rich in antirachitic vitamin (milk, eggs, and fat fish); while in tropical countries, where cereals such as rice and maize form a large part of the diet, the sunlight is no doubt an important factor in antagonizing the cereal effect. But whatever be the explanation, the work here recorded shows that perfect bone formation can be obtained even when large quantities of oatmeal are eaten, provided the rest of the diet is adequate. In regard to the controversy about wholemeal bread and the nutritive properties of the wheat embryo, Mellanby thinks this question is of but little practical importance from the point of view of rickets. To those who ascribe special virtues to various grains because of their calcium and phosphorus content, his experimental results, he suggests, ought to bring a special message of caution.

The Effect of Wine on Pulmonary Tuberculosis.

The *Lancet* of April 11, 1925, tells us that Professor Arturo Campani, Director of the Red Cross Sanatorium at Cuasso al Monte, publishes the results of his investigations on the 406 patients there with a view to determine the influence of alcohol in inducing or aggravating pulmonary tuberculosis. These patients were all males of the age between twenty and forty-seven, mainly war pensioners, and could be divided into four groups, heavy, ordinary, and moderate drinkers and abstainers. For statistical purposes Campani took three groups: (1) All the patients en bloc to establish an average; (2) heavy drinkers; and (3) abstainers. Each case was investigated with

regard to age, variations of weight, stage of the lesion, occurrence of hemoptysis and fever, and presence or absence of Koch's bacillus. Without giving actual figures, it was found that the average age was greater in those who used alcohol in the form of wine, the weight was slightly greater in the drinkers than in the abstainers, the prevalence of right-sided lesions also greater in the former, while in the latter bilateral lesions had a percentage more than double. Fever and the presence of Koch's bacillus were more marked in abstainers.

As to the percentage of improvement under sanatorium treatment, including the so-called cures, the general average was 60.5 per cent, with 76 per cent in drinkers and 55 per cent in abstainers, while the mean mortality of 1.9 per cent was divided between 0.6 per cent in drinkers and 3.1 per cent in abstainers; on the other hand, there was a slightly increased prevalence of hemoptysis among the drinkers, 66 per cent as against 62 per cent in the abstainers, but the prevalence of acute forms, or acute forms occurring in the course of chronic, was 0 per cent in the drinkers and 8.1 per cent in the abstainers, the average being 3.2 per cent.

In face of these figures, Campani says it is difficult to resist the desire to affirm that wine is far from being a poison predisposing to tuberculosis, but rather constitutes a means of defense against the invasion of the disease. He admits that statistics are often deceitful, but considers that the assertion that alcoholism generates tuberculosis should be subjected to severe and serious criticism for the reason that it is contrary to a well-known anatomical truth—namely, that alcohol directly or indirectly favors the formation of connective tissue, that it is a cirrhotic and sclerogenic poison *par excellence*. It is known that tuberculosis does not fall into line where there is a tendency to sclerosis; it is rare in the early stages of cirrhosis either of the kidneys or liver or heart, and lights up only a terminal cachectic factor. It is difficult to imagine that a fibrogenic substance, a producer of the very tissue which is the sole barrier to the extension of tuberculosis, should be harmful in the clinical picture of the disease, or that such a wasting disease should militate against an ailment which is recognized as having a saving function in organic metabolism.

Campani concludes by stating as his opinion that neither general statistics nor clinical observation have strengthened the generally wide-spread idea that alcohol, at least in our temperate climates, and especially in the form of wine, is a harmful agent in pulmonary tuberculosis, but that his present observations, although not of large extent, seem to prove the contrary.

The Effect of Ingestion of Yeast on the Leucocyte Count.

In the *Archives of Internal Medicine* for April, 1925, HEINTZ and WALKER state that six of the ten subjects that they studied with a view to establishing a base line showed a small amount of variation from day to day. Three of the remaining four developed mild respiratory infections. At the time the symptoms became noticeable, there was a marked increase in the leucocyte count. The tenth subject showed a decided rise in the leucocyte count, during the latter part of the period, without their being able to arrive at any explanation. The six curves which they give furnish a base line for comparison with the curves obtained from the subjects who were given yeast. The maximum variation obtained in these six curves is 1600.

The subjects who aided them in the study of the effect of yeast reported, the first day, without any yeast ingestion; after the blood count was taken, they ingested three cakes of one of the common market varieties of fresh yeast (Fleischmann) per day—one cake between breakfast and lunch, one cake between lunch and dinner, and one cake between dinner and the time of retiring. This was continued for seven days. The subjects were carefully watched for infections or other conditions which might alter the count. No such infections or conditions

were observed. In some cases there is no initial diminution in the leucocyte count. Possibly the interval of twenty-four hours between the first and the second counts was sufficiently long so that the decrease had disappeared and increase had begun. Some of the cases did not show a marked increase in the number of leucocytes. However, the majority of the cases studied showed a definite increase in the leucocyte count, which was much greater than the normal variation under the conditions of their experiment.

On the basis of these results they conclude that in most cases the ingestion of three cakes of yeast daily causes a marked increase in the leucocyte count in apparently normal persons.

[The question of interest in connection with these conclusions is, was enough consideration given to digestion leucocytosis?—ED.]

Carcinoma and Sarcoma of the Esophagus.

In the *American Journal of the Medical Sciences* for May, 1925, JACKSON states that many years ago he said that the mortality of malignant disease of the esophagus was, at that time, 100 per cent. Notwithstanding the great advances made in the surgery of malignancy elsewhere in the body, the ultimate prognosis of esophageal cancer remains the same to-day.

There is every reason to believe, however, that the reason for this is that the surgeons have never had a chance to develop the technique of a curative operation because the diagnosis is never made early.

The reason why the diagnosis is never made early is that the text-books and journal articles give chiefly, or exclusively, diagnostic methods that *are always negative early* in the disease.

When the time comes in which esophagoscopy shall be resorted to promptly on the appearance of certain very vague symptoms, there is ample justification for the belief that the surgeon will cure a good percentage of patients.

Squamous-celled endoesophageal carcinoma is not an aggressive type of malignancy. On the contrary it is a mild, slow, and, for a long time, purely local process.

Under palliative treatment, if the patient is never permitted to be short of an abundance of water and a full allowance of properly balanced food elements, most cases will survive at least two years from the onset of the disease, and some have survived as long as five years. One lived six years.

Patients running the gauntlet of late inferential diagnosis, and leading a precarious existence of various degrees of food and water starvation, depressed and acidotic, on a diet of intermittent supplies of raw eggs and meat broths, may not survive more than a year from the probable time of the onset of the disease.

The bougie as a diagnostic means is not only dangerous, but it is inconclusive because inferential; and its use is always hopelessly late. A cancer must be well advanced before it will stop a bougie. Even fatal cancer of the esophagus may not be obstructive.

The bougie as a therapeutic measure hastens death either by perforation or by increasing metastases. As stated by Da Costa, "No surgeon would stretch a cancer." As stated by Shallow, "No surgeon would forcibly dilate malignant stricture of the esophagus any more than he would forcibly dilate cancer of the rectum."

There are only two means by which an early diagnosis of esophageal malignancy can be made, namely: (1) Roentgen-ray examination, and (2) esophagoscopy. All other means are late, inconclusive, and some of them dangerous.

By esophagoscopy, endoesophageal cancer can be diagnosticated not only early, but with the absolute certainty essential to getting the consent of a comparatively well man to an operation he may survive.

Endoesophageal cancer can be diagosticated just as early, just as quickly and just as certainly as cancer of the cervix if an opportunity for esophagoscopy is afforded early.

Cholera Vaccination: Its Effectiveness as Evidenced by the Presence of Antibodies in the Blood of Vaccinated Persons.

In the *Philippine Journal of Science* for March, 1925, SCHÖBL and ANDAYA state that in many of the communications which treat of this procedure and results of anticholera vaccination, there are data to be found which indicate conclusively that, following the anticholera vaccination, there appear in the blood of the vaccinated persons immune bodies which persist there for a period of time varying from ten to fourteen months. These observations, made in countries during anticholera campaigns in which various preparations and doses of cholera vaccine have been used, have led to the conclusion that the immunity resulting from the vaccination lasted approximately one year. These investigators pursued similar studies in the Philippines. Although the fact that immune bodies are found in the blood of persons vaccinated with cholera vaccine had been previously established, it was considered of importance to repeat the investigations in order to see the results of their own vaccination and the effectiveness of the vaccine used in the Philippines as well as to obtain information as to the time when revaccinations should be made under local conditions.

In the literature they find results of experiments with the blood of vaccinated persons in which the agglutination test and the bacteriolytic method were used for the detection of immune bodies in the blood of vaccinated people. In their experiments the complement fixation method was used.

As far as the persistence of the antibodies in the blood of vaccinated persons is concerned, the second group (that is, those that received a single injection of 500 million) still showed traces of immune bodies in their blood about one hundred and eighty days after the single injection. Two hundred and twenty to two hundred and eighty-four days after the injection only one of the persons tested showed a trace of demonstrable immunity; the rest were negative. When the double dose (1000 million) was given in a single injection, distinct evidence of immunity was found on the one hundred and seventeenth and the one hundred and eightieth days. On the two hundred and twenty-second day one still gave a positive result, and one on the two hundred and fortieth day was negative.

Double injection evidently caused the immune bodies to persist in a fair amount (titer ½ to 1/64) in the blood of vaccinated persons, according to examinations made on the sixty-seventh, one hundred and sixty-sixth, and two hundred and eighteenth day after the second injection.

It is evident from these investigations that the antibodies produced by the injection of cholera vaccine persisted in the blood of the vaccinated persons between six and ten months. If we may consider the titer of the serum as an indictor of the degree of existing immunity, we can draw the conclusion that the degree of immunity and the duration of immunity following anticholera vaccination are directly dependent on the amount of the vaccine injected, but more so on the number of injections given, barring, of course, individual variations. It is generally claimed that a person vaccinated against cholera is just as susceptible to cholera infection as a non-vaccinated person, if not more so, during the first five days following the vaccination. This assertion is based on observations of incidence of cholera infection in vaccinated persons, and appears to be in agreement with theoretical considerations and experimental findings. But, considering the fact that the immunity is only relative, it may be well to bear in mind the findings in their experiments (which undoubtedly occur frequently), namely, that development of immunity is sometimes delayed for no apparent reason. Although the age, weight, and general condition were the same, some individuals showed relatively low titer when their serum was tested shortly after vaccination. This seems to be of practical significance in countries where cholera occurs endemically and where cholera epidemics occur in certain seasons with more or less constant regularity.

The wholesale vaccination in areas where outbreaks occur every year, as well as in places where sporadic cases occur during the off season, should be completed at least one month before the time when an epidemic may reasonably be expected to occur.

Mercurochrome-220 Soluble as a Biliary Antiseptic.

In the *Archives of Internal Medicine* for April, 1925, HILL and SCOTT claim that mercurochrome is excreted by the liver, that it appears in the bile in strong concentrations, and that bile after the intravenous administration of the drug is bactericidal when inoculated with the typhoid bacillus.

It has also been shown that, *in vitro*, mercurochrome is active against organisms of the colon-typhoid-dysentery groups and against Vibrio comma.

It has been possible to cure rabbits that had been made gall-bladder carriers of typhoid bacilli by giving mercurochrome intravenously or by mouth.

The authors believe that in mercurochrome-220 a drug has been found which experimentally meets the requirements of a biliary antiseptic, in that it is excreted in the bile in bacteriostatic and bactericidal strength, and which, as has been previously shown, is of low enough toxicity to allow its safe clinical use intravenously or by mouth. They also assert that the trial of mercurochrome clinically in both latent and acute gall-bladder infections is not only justified but also clearly indicated from these experimental findings.

The Treatment of Infantile Scurvy.

In the *Proceedings of the Royal Society of Medicine* for April, 1925, STILL states that the majority of cases in his series were treated with "potato-cream." The biochemist as a result of experiments on animals seems inclined to rank potato as of lower antiscorbutic value than fruit-juice, particularly orange-juice or lemon-juice. Speaking purely as a clinician and admitting freely the practical difficulty of insuring strictly comparable conditions of experiment in clinical work, he would suggest that potato is at least as potent an antiscorbutic as either orange-juice or lemon-juice. Apart from its potency potato has also the merit of being one of the most generally available of antiscorbutics.

The method of preparation and administration is very simple. The potato is baked in its skin, so as to become as mealy or floury as possible. The floury part of the potato is then scraped off into a cup and broken up finely, hot milk is next added gradually, and the mixture is at the same time rubbed up with a spoon, just as is done in mixing cocoa, so as to obtain a uniform and smooth mixture. Enough milk is added to make the consistency that of a medium cream, roughly a cream which will pour out of a jug rather heavily; in actual measurement, two heaped teaspoonfuls (with an average-sized teaspoon holding one and a half drachms of water) to one and a half ounces of milk, or one ounce by weight of the crumbled floury potato to one and a half ounces of milk. Of this so-called "potato-cream," two domestic teaspoonfuls, that is, three to four drachms, are given three or four times daily, and each dose is given in part of a feed.

Attention to the details mentioned is necessary for practical reasons. If the potato-cream is not rubbed into a very smooth consistency some infants object to the rough sensation in the mouth. A smoother mixture can be obtained by using hot milk than by using cold milk in the preparation of the potato-cream. If the potato-cream is put into the whole of a feed and part of the feed is refused, the infant will fail to get the full dose of potato, and as one of the common symptoms of scurvy is loss of appetite, the infant at the beginning of treatment will often refuse to take the full-sized feed for his age. It is generally wise, therefore, to ascertain first what bulk of feed the child has recently been taking, and put the dose of potato into about two-thirds of this, after taking which the infant can have the re-

mainder of the feed. On the other hand, the potato-cream should be put into as large a bulk of feed as is reasonably certain to be taken, for the more it is diluted the less the infant is likely to object to the roughness of the potato.

He has tried in several cases to determine the earliest time at which definite improvement was noticed under the particular treatment used. The symptom which usually begins to abate first is the tenderness in the limbs, and generally the next improvement noticed is some return of movement in the affected limb.

The time which must elapse before a case of infatile scurvy loses all its symptoms depends largely upon the lesions which the disease has already produced when treatment is begun. Where, for instance, there is a large effusion of blood under the periosteum, and still more where periosteal ossification has taken place enclosing the subperiosteal hemorrhage in a bony sheath, it may be many weeks before the last trace of thickening will have disappeared although the child may seem well otherwise. He has noticed also repeatedly that, as in the case mentioned above, blood-cells can often be found persisting in the urine for days, or even weeks, after all other symptoms of scurvy have entirely disappeared.

The potato-cream treatment at the age at which infantile scurvy is most frequent, namely, from six to ten months of age, is highly effective as a temporary and curative measure in the acute stage, but it is likely to produce digestive disturbance if continued after the acute symptoms of scurvy have all disappeared. In the majority of cases this will take place in about ten or fourteen days; it almost seems as if there was a peculiar tolerance of potato during the acute stage and that this tolerance passes off as the scurvy disappears. For this reason potato-cream is not suitable as a prophylactic, for which purpose fruit-juice should be used. He will have more to say of prophylaxis later.

Next to potato-cream he finds that orange-juice was the most frequent remedy employed in his series. He has used two drachms four-hourly. He is under the impression that this is less rapidly effective than a similar dose of the potato-cream; certainly it is an error to suppose that orange-juice is so potent that a small quantity such as one or two drachms administered once or twice daily will effect a rapid cure of scurvy; such an amount is not even potent enough in some cases to prevent scurvy, and much less to cure it. If orange-juice is given in doses sufficient to produce such rapid improvement as occurs with the use of potato-cream it is liable to cause diarrhea. In the treatment of scurvy it is well to bear in mind the warning of Glisson, that the child with scurvy "doth impatiently endure purgations"; in other words, that diarrhea is one of the chief dangers of the disease. In his series of 134 cases there were six deaths, and four of these were due to diarrhea.

Rickets and the Deprivation of Sunshine and of Ultraviolet Light.

In *The Practitioner* for May, 1925, TUBBY states that unfortunately in fog-bound countries, where the rays of the sun are often absent for a considerable period during the winter, heliotherapy is limited in its application. In these circumstances we must provide the means of obtaining artificial sunlight. We must insure in all centers access to sources of ultraviolet rays, and the best is the mercury-vapor-quartz lamp. Exposure for five minutes every day to a lamp of 3000 candle-power will cure rickets and its complications. Even exposure to the rays twice or three times a week will be sufficient to prevent it. Such lamps should be installed in all children's departments of hospitals, infants' hospitals, crèches, infant schools, and dispensaries. It will be found that this treatment is particularly useful from the third to the eighteenth month of the child's life. Ultraviolet rays should not, however, be relied upon to neutralize the effects of negligence so far as fresh air, general sanitation, and good feeding are concerned.

Observations on the Administration of Dochez's Antiscarlatinal Serum (Scarlatinal Antitoxin) Intravenously.

In the *Boston Medical and Surgical Journal* of May 14, 1925, THENEBE states that all his cases treated with Dochez's antiscarlatinal serum were treated by the intravenous method of administration excepting one, which was treated by the intramuscular method of administration. Only two of the patients complained of a chilly sensation during or after the injection. None developed a frank chill. There was no rise in temperature in any case except two after the administration of the serum. No skin test was done to determine individual sensitivity to horse serum prior to the serum administration because in none was there a history of prior injection of horse serum, asthma, hay-fever, urticaria, etc. Only 4 of the 22 patients upon whom serum was used developed a serum rash. Unconcentrated serum was administered.

It is logical reasoning in his estimation to believe that a smaller dose of Dochez's serum will be required when administered intravenously rather than intramuscularly. This of course holds good in the administration of diphtheria antitoxin. By giving Dochez's serum by the intravenous method, immediate maximum concentration of antitoxin in the blood stream is obtained. This factor of course is desirable in all cases, particularly those representing moderately to severe toxic and septicemic types of disease.

He believes his cases demonstrate that Dochez's serum can be administered effectually by using small doses intravenously, the usual drop in temperature occurs, and the rash fades. The rash starts to fade with the neutralization of toxin, but remnants of the faded rash remain for one to four days after the temperature is normal, in the average case.

The incidence of complications and sequelæ in his opinion seems to be lessened by the administration of Dochez's serum. However, complications do develop after serum administration. He does not feel that additional doses of serum will affect materially the progress of complications after the complications are well advanced. The reason for this may be explained by the fact that there is an additional focal infection present, secondary to the original one (the original one being in the great majority of cases the nasopharynx), before the serum is administered. For instance, there is an early cervical adenitis or an early otitis media present before the serum administration. He has yet to see a patient who does not show reddened tympani early during the course of the disease, and surely the great majority of the cases present palpable cervical glands. The deep cervical glands are often involved and are not palpable at the time of the primary examination. He has also observed arthritis very early during the course of the disease. It seems that a further extension of the simple inflammatory process may be averted by an early adequate dose of Dochez's serum which neutralizes the toxin and thus permits the immunizing forces of the body to concentrate upon combating any further extension. The highly probable bactericidal substance present in the serum should also act as a further measure in preventing extension of a simple inflammatory process. If the inflammatory process is well advanced and this same process could represent a mixed infection, *i.e.*, suppurative adenitis or mastoiditis, one would not expect the process to be affected by additional serum. A secondary rise in temperature after the initial fall usually denotes the presence of an active inflammatory process in the nature of a complication.

The patient who presents a streptococcic bacteremia may and may not be benefited by the administration of Dochez's serum, but it should be used in large doses as there is certainly no nearer specific than this serum. An attempt should be made to localize the focus or foci of infection which supply streptococci to the blood stream in these patients. There may be any number of these foci after the initial blood-stream invasion. To believe that Dochez's serum, or any measure, would act specifically

upon a patient presenting multiple foci would be presuming too much. There are many cases on record in which a bacteremia was present which have recovered. He had one case which was an excellent example of this, in which the focus was apparently an ethmoidal sinusitis, and here again apparently a single focus rather than multiple foci. With the subsidence of the sinusitis the source of supply of streptococci to the blood stream was obliterated. The patient should be given the benefit of Dochez's serum administered in large doses in order to combat toxemia and to permit the very probable bactericidal properties of the serum to functionate.

Thenebe summarizes his views as follows:

1. Confirmation of the clinical results obtained by F. J. Blake, to wit, that antiscarlatinal serum is a valuable therapeutic agent in the treatment of scarlet fever.

2. The toxemia accompanying scarlet fever can be combated effectually by the administration of serum intravenously in smaller doses than are usually administered intramuscularly in toxic and septicemic types of disease.

3. The intravenous administration of serum affords maximum immediate concentration of antitoxin in the blood stream; its use being indicated in the moderate to severely ill.

4. It has been used without undesirable and untoward effects and therefore would be a safe procedure.

Surgical and Genito-Urinary Therapeutics

The Treatment of Fractures.

LANE *(Lancet,* Jan. 31, 1925) states that the most important law he ever formulated is that "the skeleton represents the crystallization of lines of force." It is upon the knowledge of this law that the scientific treatment of fractures depends. The same law applies with equal truth to every soft structure in the body, and perhaps more effectually and obviously to the several portions of the gastrointestinal tract, so as to impose on the community almost all the diseases of civilization. Few surgeons appear to have sufficient skill and mechanical knowledge to deal effectually with fractures by operative procedures. As the risk of a possible unsuccessful result is so manifest, it is very advisable that any medical man who is asked to treat a fracture should call another into consultation, and he might with advantage choose an opponent. In this way he will materially safeguard his interests. In any case he should join a medical defence society when he starts in practice.

The war produced a great change in the treatment of fractures by operation. Many of those surgeons who had been most actively opposed to operations on simple fractures did not hesitate to put plates and screws into fragments of the broken bones in compound fractures, usually produced by projectiles, with the most disastrous results. It took quite a long time before the folly of this procedure was realized, and a stop was put to this practice. Even when the wound had healed or was apparently quiescent, the introduction of such large foreign bodies as plates and screws not infrequently resulted in renewed activity in the growth of septic organisms which had lain dormant in the bone and in the soft parts, so that disaster followed such operative procedures only too frequently. It took a long time before this complication was recognized and dealt with, but finally the results obtained with suitable precautions were excellent.

With all this experience some surgeons still continue to secure the fragments of bone in recent compound fractures by means of plates and screws with the same most unfortunate results. Every new procedure would appear to involve necessarily much damage and loss of life to the community, till the principles of the treatment

and their application have been thoroughly grasped by surgeons generally. The use of steel screws has been objected to on the ground that they produce a rarefying osteitis, and that they have to be removed in consequence. This is due to imperfect asepsis and results only when the aseptic precautions employed by surgeons are insufficient.

Great advances were made during and since the war in the treatment of severe compound fractures of long bones especially, and much was done in improving methods of traction in simple fractures, by which the resistance offered to the apposition of fragments by the shortening up of the soft parts by hemorrhage and inflammation can be gradually overcome.

The most effectual method of treatment of simple fractures of the shafts of the long bones of the leg in which operative interference is not called for is by forcible extension, usually under an anesthetic, followed by the use of an ambulatory splint. The splint must be so constructed that while the fragments are being constantly extended the patient is able to lead an active life, moving the joints of the damaged limb with perfect freedom. In this way not only does the patient avoid stiffness of the joints and muscles which accompanies the ordinary methods of treatment, but the formation of callus is hastened by the free circulation of blood through the limb. This splint can also be employed with great advantage after the fragments have been secured by means of plates and screws. In the case of fracture of the shaft of the long bones of the leg this principle is carried out in an ideal manner by the extension apparatus devised by Mr. Hoefftcke. The principle involved of replacement of fragments by extension, the continued exercise of traction by some form of apparatus, and the free spontaneous functioning of the muscles, soft parts, and joints in the vicinity of the fracture, is that which governs the treatment of all simple and compound fractures.

In the case of malunion following compound fractures, only when the operator has every reason to suppose that the tissues have become freed from the presence of any organisms which existed in the original wound should surgical measures be undertaken with the object of restoring axial continuity of fragments. Such operations are often most difficult and may make a great demand on the knowledge, judgment, and skill of the operator. This is particularly the case when both bones of the forearm or leg are involved. Grafts of bones should be used freely to fill up any gaps that may remain between the fragments, though it should be borne in mind that quite a considerable interval can be readily filled in by the crystallization of bone along the line of force.

The Management of Hernias.

COLEY (*International Journal of Medicine and Surgery*, February, 1925) notes that the mechanical treatment of hernias dates back to the beginning of medical history. Three main types of trusses are mentioned: the Knight truss, which consists of a half ellipse of spring steel covered with rubber tubing, to one end of which a spherical button-shaped piece of wood is fastened by a short piece of metal. A leather strap is attached to both ends of the truss. The chief advantages of this appliance are the simplicity of adjustment, cheapness, and ease with which it can be kept clean.

The French truss consists of a semi-elliptical spring, leather or cloth covered, to one end of which a well-stuffed pad is attached, the other end terminating in a strap which passes around the back and fastens in front to the pad. When made for double hernias, the two pads are held together in front by a short cross-strap of leather. This truss is efficient, moderately priced, and is the model in routine use in the clinic for adults. When the rupture is especially large or difficult to retain a truss is designed and measured to fit the individual needs. These special trusses usually have a perineal strap whhich aids in keeping pressure directly on the internal ring and prevents displacement of the pad upward.

The frame truss is a modern refinement that probably represents the most satisfactory in comfort and adaptability. It consists of a frame of metal, usually phosphor-bronze or aluminum, which encircles the patient just below the iliac crests. Two points of support are afforded by pads, one on either side of the sacrum, and to the frame a pad is attached exactly opposite the hernial ring. The best pads are those filled with water, covered with plush or leather. These trusses, if properly fitted and adjusted once a year with change of pads every six months, afford about the best mechanical means of treating inguinal hernia (and femoral) that we possess.

The following indications for mechanical treatment are set forth:

Children below the age of three years with hernias that can be safely and satisfactorily held up with a truss.

Adults who desire for one reason or another to postpone operation for a brief time. Business or family reasons may influence such a decision.

Adults affected with some intercurrent disease which contraindicates operation, even though done under local anesthesia.

Very old, enfeebled persons.

Recurrent hernias where anatomical reasons exist that influence the surgeon against operation.

Umbilical hernias in children up to the age of twelve should be treated by strapping. No case should be subjected to operation until a fair trial with the button has failed, and as a rule surgery should be postponed until the child is ten or twelve years old. Button-strapping is never indicated in umbilical hernia in adults. However, in these cases, an abdominal belt is often helpful.

Postoperative ventral hernias in obese subjects, especially if large and with musculo-aponeurotic deficiencies, are not always successfully operated upon. An abdominal belt with an inner pad which covers the bulge seems to be the method of choice.

Direct inguinal hernias, especially those that have been operated upon once and have recurred, are likewise difficult to cure surgically, and unless a living suture operation be thought advisable, these cases should be given a well-fitting truss.

Scrotal supporting bag, for enormous scrotal hernias that are quite beyond any possibility of relief by operation or truss. These patients with long-standing irreducible hernias are often incapacitated by the dragging weight, and it is in this group that relief is often afforded by a cloth bag; straps of cloth run to the shoulders, crossing like suspenders and transferring the "drag" to the shoulders. This tends to reduce the opportunity for strangulation and for increase in size, but is of course only a makeshift effort to give a measure of relief to an otherwise hopeless condition.

The contraindications as to mechanical treatment are thus formulated:

Incarcerated, irreducible, or strangulated hernias are obviously surgical cases. Truss treatment is never indicated.

Hernias associated with hydrocele of the cord, or of the canal of Nuck in the female, or with undescended or partially descended testis, should never be treated with a truss.

Large, long-standing scrotal hernias which slip by a truss are unsuitable. It is a sad fact that postponement of operation when these hernias were small and easily amenable to operative measures ultimately results in their becoming unsuitable for treatment by either operation or truss.

Epigastric hernias are never suitable cases for mechanical treatment.

As to the indications for operation, and the type of operation to choose, indirect inguinal hernia should be treated by the simple Bassini operation or one of its modifications. In children under four the failure of a truss to hold the hernia, or the occurrence of strangulation or incarceration, demands surgical interference.

Very large scrotal hernias, particularly those of the sliding variety, may be best treated by the living suture method.

Femoral hernias, except the most neglected cases, should be operated upon between the ages of four and sixty, barring serious contraindications. Trusses seldom hold this type of hernia with comfort, and results from operation are excellent.

Direct inguinal hernias, though less apt to become strangulated due to the shape of the sac and the fact that they practically never become scrotal, nevertheless can be looked upon as definitely surgical. The percentage of recurrence is distinctly greater in direct than in indirect hernia. It is this group which has stimulated surgeons to devise various methods of repair based upon new principles and to modify the old and established Bassini operation.

Another group of modifications which depends upon the utilization of the external oblique aponeurosis for additional support is best exemplified by the Andrews operation, which, though published in 1895, has in the last decade found increasing favor and is now one of the most popular methods in use for curing direct hernia. In brief, it consists in the overlapping of the external oblique aponeurosis, and, as performed by Steteen and Schley, the cord is placed superficially, lying just beneath the skin. It is the method of choice for all direct hernias or for indirect hernia where the muscles are deficient.

Lastly, one may mention the use of living sutures which Gallie has popularized and which represents the greatest single advance in the past two decades in the management of direct hernia, recurrent inguinal hernia, and umbilical and ventral hernia. Gallie removes a piece of fascia lata from the thigh (external surface) and splits it into strips about ¼ inch wide. These strips are used as sutures. Instead of attempting to pull the internal oblique and transversalis muscle mass forcibly to Poupart's ligament, he weaves the suture across from one side of the defect to the other, much as one darns a sock. The sutures live and become an integral part of the repair, and tension—the bugbear of all hernia operations—is avoided. Large openings can thus be filled in with strong, living tissue, which could not be obliterated successfully by merely pulling the edges together under tension, as in the ordinary Bassini. When one does a Bassini using living sutures, and in addition an overlapping of the external oblique aponeurosis beneath the cord, one has given the utmost that can be accomplished to assure the patient a permanent cure.

Gallie's method is a major procedure, and is not to be advised for simple hernias which can be satisfactorily managed by the ordinary Bassini or one of its modifications.

There are two distinct methods of operating upon the femoral hernia, that is, by the femoral and the inguinal approach. Both have their advocates, but as Watson states, "the femoral operation is preferred by a majority of operators because it is more direct, simpler, and the average surgeon can perform it more quickly than the inguinal operation; and the results are just as good provided the femoral canal is closed."

Local anesthesia is to be urged as the method of choice in adults with strangulated hernia regardless of the variety, and its routine use will tend to reduce the high mortality rate. It is likewise a necessity in aged persons or those afflicted with a constitutional disease which precludes the safe use of a general anesthetic; such as diabetes, cardiac or renal disease, pulmonary tuberculosis, asthma, or chronic bronchitis.

Local anesthesia, nevertheless, has certain limitations. It is not suitable for children, or for highly nervous and apprehensive adults. It consumes much more time, since it necessitates and demands gentleness in all steps of the operation. Where much dissection is required, as in recurrent cases, it is not satisfactory, and in large ventral hernias it may be inadequate.

Osteomyelitis in Children.

CHATTERTON *(Minnesota Medicine,* February, 1925) believes that the relative infrequency of osteomyelitis in children is largely a cause of many mistakes in early diagnosis. To avoid errors and delay it is advisable to regard as osteomyelitis all acute febrile cases, especially in children exhibiting pain and inflammatory changes in the region of the epiphysis.

There is a rich blood supply adjacent to the epiphyseal cartilages, most of which does not come from the nutrient artery but from vessels which encircle the growing end

of the bone and send branches of considerable size direct to the epiphyseal plate and adjacent medulla. These branches break up into numerous wide capillaries in which the blood current is slowed and opportunity is given for the interchange of metabolic substances upon which the growth of bone depends. The terminal arteries in the metaphysis admit emboli over twenty microns in diameter. This may explain why apparently large masses of bacteria can find lodgment in ends of bones and start infection while they are kept out of arteries elsewhere in the bone.

The bones possessing the highest growth coefficients are the femur and tibia, and these bones are most frequently affected by osteomyelitis; and even the ends of these bones most frequently affected, as shown by Klemm, are the ends possessing the most actively growing metaphysis.

Certain changes will take place, depending somewhat on the kind and virulence of the infection. Great or small amounts of bone will be destroyed, due to interference of circulation, edema, and activity of bacterial products.

The infection may become localized, destroy a small portion of bone, become a cavity walled off by a definite membrane, and become sterile (localized abscess).

There may be a general involvement of bone without any attempt at localizing, without producing pus, but destructive to large areas of bone.

There may be the formation of an abscess and discharge through the epiphyseal line (suppurative epiphysitis, so-called).

An abscess may form and involve the entire medullary canal with or without the discharge of pus through some portion of bone.

An abscess may form and discharge under the periosteum or through the epiphysis into the joint.

Severe cases may result in destruction extending the entire length of the medullary canal, under the periosteum, and also into the joint.

The clinical symptoms of acute bone infections vary greatly. Pain in bone or near site of bone infection is quite constant, and such complaint should not be overlooked on physical examination. The general symptoms of sepsis, chills, sweats, fever, headache, prostration, vomiting, rapid pulse, and laboratory findings of a high leucocytosis, accompany the severe case. Local symptoms of pain, swelling, redness and effusion into neighboring joints are constant as the disease progresses. Blood culture and *x*-ray findings come too late to be of value in aid of early treatment of the acute case. In later stages in the neglected cases, if the child does not die of sepsis we find large abscesses breaking down, formation of sequestra and often involvement of joints, and deformities of extremities due to contracture of tissue.

To prevent destruction of the bone, early drainage of the affected part is essential. Upon the first indication of tenderness, redness, swelling, pain upon pressure or pain upon percussion of bone, free drainage should be established. Several incised wounds through the outer tissue and periosteum should be made; then either a portion of the cortex one inch square should be removed down to the medulla, or, with a large bone drill one-half inch in diameter, the medullary canal should be exposed. Drainage wounds are always apt to be too small rather than too large. If pus is found, usually gauze or other drainage is not necessary except to keep the flesh wound open; but if no pus is found the cavity may be lightly packed with sterile gauze, and usually within twenty-four hours pus will be found discharging from some of the various openings. Moist dressings, hypochlorite, normal saline or boracic acid may be used as aids to drainage, but discontinued upon any signs of maceration of the skin.

In cases forty-eight hours old, in severe grades of infection, extension to the shaft has taken place. In many cases treated early in a few days all signs of infection subside, and in a few weeks the various open wounds close and the process becomes arrested without further bone involvement.

The surgeon rarely sees acute bone infec-

tions early enough to secure ideal results, and treatment of the subacute cases with bone destruction are those with which he most frequently deals. After the acute infective stage has passed, evidenced by absence of pain, temperature, and leucocyte count, the various discharging sinuses should be kept clean and dry until such time that there is evidence of sequestra formation. This period may be from a few weeks to several months.

It is extremely strange why growth of bone is not more frequently interfered with in violent infections, but through the understanding of the bone pathology we see that in the greatest number of cases the epiphysis escapes. Destruction of the epiphysis always results in diminished growth of bone, and frequently in serious deformity and disability. In a young child with proved destruction of the growing powers of epiphysis, it would be well to destroy the corresponding epiphysis in the well bone to prevent deformity.

Immediate Mobilization for Aseptic Arthrotomy.

WHIPPLE *(American Journal of Surgery,* March, 1925) by immediate mobilization means movement as soon as the patient has recovered complete consciousness after operation, and movement made by muscular effort by the patient.

Active motions in the joint carried out after the danger of bleeding from the cut surfaces of the joint capsule and synovial layer is past, accomplish the following results: Fibrinous adhesions are aborted; circulation in the joint capsule, the ligaments and the muscles associated with the joint is kept active and normal; the stiffness and shortening that occur in its joints and muscles in any limb that is immobilized are prevented; careful and accurate massage can be given earlier and more regularly when the joint is not immobilized. Heat and diathermy can be applied while the joint is being actively moved.

Immobilization, for a variable time, is indicated: if the incision has been extensive; if considerable trauma has been necessary in the joint surface or structure; if there are associated with the displaced meniscus or loose body, and in the latter this is not uncommon, hypertrophic bone changes, as shown by lipping or by nodular outgrowths of the articular cartilage or villous changes in the synovial lining; if there is an associated tear in the lateral ligaments or joint capsule; if there is marked relaxation of the joint capsule the result of repeated joint effusions.

The ultimate result in operations for displaced cartilage or loose bodies (barring those associated with hypertrophic bone and synovial changes) has been uniformly good whether the operations have been followed by immediate mobilization or by immobilization. The difference worth considering is that this good result has been accomplished in a much shorter time in the cases submitted to immediate active mobilization. To say that the immobilized cases get ultimate good results is no better argument than it is in fracture work where those advocating immobilization for three to five weeks in encircular plaster claim good ultimate results.

The earliest return to normal of the joint outline or contour, of complete function and of full earning capacity, the shortest hospital stay—these are the criteria of therapy to the patient, be he laborer or magnate, and they should be applied in judging of the relative merits of mobilization or immobilization in clean arthrotomy for the lesions under discussion.

Thirty-three cases were selected only because they were carefully followed for periods ranging from three to sixty months after operation. Twelve of these cases were operated upon for displaced internal semilunar cartilage, and immobilized after operation. Twelve having the same operation for the same lesion were given immediate active mobilization. Five were given splints with immobilization after operations for removal of loose bodies. Four were given active mobilization after similar operations.

The more rapid complete convalescence of the mobilized cases is fairly convincing as to the value of the method.

For simple clean arthrotomy for removal of displaced cartilage or loose foreign body, active regular and increasing mobilization of the joint after the patient has regained full consciousness, or perhaps within twelve hours after operation, shortens the hospital stay and gives an optimum anatomic, symptomatic and economic result in the shortest time.

The Treatment of Placenta Prævia.

MILLER *(New Orleans Medical and Surgical Journal,* March, 1925), after a discussion of this subject, quotes the experience of the Charity Hospital concerning 40 cases admitted during the years 1918 to 1923 and handled by thirteen different men. Miller concludes his article by the statements that 30 of the patients were white and 10 were colored; the ages ranged from fifteen to forty-four, the majority being between twenty-five and thirty-five; the parity ranged from one (in 4 cases) to 14; the period of gestation ranged from five months to term. The type was stated in only 24 cases and was centralized in 12 of these. One case was treated expectantly, and the final outcome is not known. Three others delivered spontaneously almost immediately after admission. Of the remaining 36 cases, 22 were handled by radical and 14 by conservative measures. In the radical group eight patients were delivered by Cæsarean section, of whom two died and four of the remaining six had more or less serious infections. Five cases were treated by version followed by extraction; of these three died, and one of the remaining two had serious infection with temperature to 105°. Nine were treated by manual dilatation and version, five of them being on the same service. Two died, one of ruptured uterus and one of shock; four of the remaining seven had laceration, and another was badly lacerated but escaped infection. In the second or conservative group, three were treated by pack and version, with no deaths and one infection. Eleven were treated by the bag, followed by forceps or version in seven instances. There was one death and two infections. The total maternal mortality therefore was eight of the forty cases (20 per cent), the deaths being variously due to sepsis three, shock four, and ruptured uterus one, and all but one of them occurring in the group treated by radical measures. It is interesting to note that 18 of the cases were on the same service, one man handling 12, and that the mortality in this group was zero. It is interesting to note, too, that nearly every infection on this service followed a departure from the conservative measures usually employed.

Twenty-one babies were born dead or died before leaving the hospital, giving a fetal mortality of nearly 54 per cent. As six were born before the period of viability, three were macerated, and one hydrocephalic, the corrected mortality is 28 per cent, which is still sufficiently high to prove our contention that the interests of the child in placenta prævia are already in such jeopardy that any additional maternal risk for its sake is entirely unwarranted.

Placenta prævia is a true emergency, as grave in its consequences as eclampsia or ruptured ectopic, and demanding just as prompt treatment.

Any unexplained bleeding after the sixth month of pregnancy should be diagnosed and treated as placenta prævia until it is proved otherwise, and the diagnosis should be established even at the risk of exciting premature labor.

Immediate termination of pregnancy should be the rule as soon as the diagnosis is confirmed; temporizing measures are justifiable only in exceptional cases and never except in a hospital.

Examinations are to be made in a hospital, under the strictest asepsis, and never until preparations have been made for immediate packing or version.

Forcible dilatation, extraction and Cæsarean section give uniformly poor results;

pack, version and the bag give the most uniformly satisfactory results. The mode of delivery must depend upon the indications in the individual case, but the basic principles in every instance are to conserve blood loss, to avoid sepsis, and to minimize trauma.

The Objective Determination of Gonad Failure in the Male.

LAWRENCE *(Boston Medical and Surgical Journal,* March 12, 1925) premises his paper by the observation that a critical study of the evidence concerning the value of endocrine therapy for gonadal failure in man involves the digestion of such an enormous amount of poorly prepared material that a certain amount of mental nausea results. Nowhere in medical literature is there such a mass of conflicting conclusions based on so little adequate proof.

The only demonstrable effect of gonadal internal secretion in the male is that upon secondary sex characteristics. It has not been shown that its failure is the cause of senescence, or of psychological alterations. The indications for substitutive therapy would therefore be limited to two conditions. It might logically be employed to prevent changes occurring after complete castration; or to bring about normal development in eunuchoid individuals provided it could be demonstrated that the gonadal hypofunction was primary and not secondary.

If substitutive gonadal therapy is indicated there are three methods of applying it:

First, by administering tablets of dried extract of animal testicles by mouth. As far as can be ascertained from the literature there is no proof that this method of administration has any demonstrable effect other than a possible psychological one.

The second method of administering testicular extract consists in the injection under the skin of fresh testicular substance. The results of one thousand such injections or, as he terms them, implantations have been reported by Stanley. The subjects were almost all prisoners in the California State Prison. The material injected was the testicular substance of goats, rams, boars, or deer. Injection was made with a pressure syringe, underneath the skin of the abdomen. The author reports that there were comparatively few sloughs.

Benefit was determined by the patient's statements. In no case were any objective findings reported. If the patient's statements be accepted, the results of this form of organotherapy are extraordinarily successful, and all men should have a "shot" now and then. But it requires a finer faith in human nature than most of us possess to accept the unsupported statement of a convict as scientific proof.

The third method employed in the treatment of real gonad failure in the male is the transplantation of part or all of the testicle. Here again no conclusions can be reached which are of practical value in determining the advisability of such measures in any individual case. There is no question but that in birds and lower animals testicular implantation has very definite effects, and that these effects are due to the endocrine activity of the transplants. In the human male, however, transplants from lower animals do not persist, and transplants of homologous material are yet too few to furnish convincing evidence. Such results as are reported are suggestive of future accomplishment, but do not establish the value of the treatment.

The Value of Debridement in Treatment of Burns.

A form of "débridement" was employed by WILLIS *(Journal of the American Medical Association,* Feb. 28, 1925) in the treatment of a severe burn in a child. A third-degree burn involved the median and interior aspects of both thighs, from the junction of the middle and lower third up over the inguinal region on the right, and over the inguinal region and to the anterior superior spine on the left. Under ether, the greater part of this area was

cleanly excised with scalpel, the dissection extending down to the apparently uninjured subcutaneous tissue. A dry dressing was applied. Within six hours the temperature had fallen to normal, and the rate of the pulse had declined to less than 100. Accompanying these changes, there was a striking relief from pain and a distinct improvement in the patient's appearance. A healthy granulating surface soon allowed the application of Thiersch grafts, and the patient was discharged in excellent condition.

In burns, as in traumatic shock, there occur, experimentally, an increased concentration of the blood, with higher corpuscular count and blood nitrogen, while the alkali reserve is not appreciably affected until late in the course of the intoxication. Accompanying these changes in composition of the blood, there is a gradual decline in the blood-pressure. In untreated animals, definite structural changes could be detected in the intestine, kidneys, and suprarenals. Where excision of the burned areas was practiced, the blood changes were absent or very slight; recovery was much more rapid, and when the animals were killed there was no evidence of structural damage in the organs mentioned as was demonstrable in the untreated controls. Up to the present six cases have been treated by as complete removal of the burned tissue as possible, with recovery in all but one instance.—*American Journal of Surgery*, April, 1925.

A Lamb's-wool Tampon for Tonsil and Adenoid Operations.

PEARLMAN *(American Journal of Surgery*, April, 1925) concludes his article on this subject as follows:

The gauze sponge that is used in practically all tonsil and adenoid operations is manifestly inadequate for the requirements of this operation. Its function as a sponge is unnecessary and undesirable. It is decidedly unsatisfactory as a tampon, and causes more or less trauma. The lamb's-wool tampon, on the other hand, effectively meets all the requirements. Because of its softness and flexibility it can be manipulated in the fossæ without causing any trauma. Being non-absorptive, resilient and non-shrinkable it is an effective tampon for hemostasis. In a series of over one thousand cases in which this tampon was used the advantages enumerated above were conclusively demonstrated. This new tampon greatly facilitates the tonsil and adenoid operation.

Polyposis of the Colon.

In an excellent, well illustrated article on this subject, ERDMANN and MORRIS *(Surgery, Gynecology and Obstetrics*, April, 1925) summarize their views as follows: For purposes of standardization it is suggested that the term "polyposis of the colon" be limited to designate an adenomatous hyperplasia of the intestinal mucous membrane as opposed to those polypoid tumors of the intestine which are histologically fibromata, myomata, etc.

Polyposis of the colon appears to be a uniform, non-specific mucous membrane reaction, variable only in degree, due to a chronic irritant acting on a preternaturally sensitive mucous membrane.

It is manifested grossly as scattered intralumenary tumors varying in size from a split pea to a grapefruit.

Two clinical types may be distinguished: The adolescent variety, signalizing itself in early youth by chronic, recurring attacks of intestinal hemorrhage and diarrhea, and showing a distinct tendency to involve members of the same family.

An acquired variety first appearing in adult life in association with frank evidences of chronic traumatic and inflammatory lesions to which they are evidently secondary.

The two types have in common (*a*) the marked predilection for the large gut; (*b*) a malignancy incidence of more than 40 per cent; (*c*) a tendency to chronic intestinal hemorrhage and diarrhea. They are dissimilar in that the one (adolescent) is wide-

ly disseminated, appears in almost countless numbers, and shows no gross evidence of a causative lesion; while the other (adult) occurs in limited numbers and extent, with, almost invariably, associated gross evidence of trauma, inflammation, or foreign body. The one is essentially a disease of early life, while the other occurs in middle or late life, the cumulative result of prolonged irritation incident to years of functional activity of the gut.

In the presence of persistent and unexplained rectal bleeding and dysentery in early life, suspicion should be aroused as to the existence of the adolescent form of polyposis of the colon; in adults, although a relatively less frequent cause, its consideration should not be neglected in a differential diagnosis of an obscure case of bleeding and dysentery.

Indications for treatment are the depleting hemorrhage and diarrhea and the high malignancy incidence. Non-radical, palliative treatment comprises cecostomy, appendicostomy, irrigations, and radium therapy. Radical, effective treatment, excision of the polyp-bearing area, is limited by technical difficulties and the inability to predict, preoperatively, the extent of the process.

Papilloma of the Ureter and Kidney.

DAY, FAIRCHILD and MARTIN *(Surgery, Gynecology and Obstetrics,* April, 1925) conclude that when a patient has hematuria, or any other symptom likely to be of renal origin, his physician should not be content until he discovers, first, the primary source of the bleeding, and second, the pathological nature and extent of the lesion behind it, if this be reasonably possible by an adequate urological examination.

Thorough urological examination may not result in an absolutely accurate pathological diagnosis, but in a general way it does tell the surgeon what to do and notifies him to look for the unusual and unexpected, as well as the every-day pathological findings.

Primary nephroureterectomy offers the patient the maximum chance of complete cure, and a two-stage nephrectomy and ureterectomy should not be necessary in an increasingly larger percentage of cases if a few simple rules are observed.

In the removal of a neoplastic kidney, or if there is suspicion of any kind of tumor, splitting and examination of the kidney should be made before closure.

The presence of pelvic papillomata is an indication for ureteral section.

The Influence of Habit-forming Poisons, Particularly of Nicotine, in Salvarsan Treatment.

HUEBNER *(Urologic and Cutaneous Review,* February, 1925) notes that one reads with increasing frequency of salvarsan resistance. Silberstein believes there develops a salvarsan resistance on the part of the spirochetes, although this resistance has not been experimentally proven.

Huebner notes distinct diminution in the effects of salvarsan from 1919 to the middle of 1922 in spite of the effort made to check this by strengthening of the treatment; later there was evident improvement in the results from the middle of 1922 on. Perhaps this improvement is to be attributed to the introduction of silver salvarsan, but for the most part to a diminution of the injury done to the German people in the postbellum years by the abuse of alcohol and nicotine.

According to the statements in the Statistical Handbook of the German State the consumption of brandy in Germany rose from 1.9 liters per capita in 1918 to 1919 to 4.1 liters per capita in 1921 to 1922; the consumption of beer from 25.2 liters to 54.3 during the same period. But even these figures give no adequate picture of the real conditions, for through the well-recognized "Hole in the West" great quantities of alcohol and also, but more important, manufactured tobacco were introduced into Germany which could not be included in the

statistics. Great cargoes of cigarettes were brought to Cologne from England, and in Elberfeld, near the border of the occupied zone, the consumption of cigarettes rose among the young male population immeasurably, as could be seen by the yellowish-brown stains on the fingers of the patients in the hospital.

The destruction of the spirochetes is not caused directly by the action of salvarsan, for the spirochetes as seen under the dark-field microscope are not visibly affected by the introduction of salvarsan solution. Salvarsan undergoes a change when injected into the blood, the nature of which is entirely unknown at present, which transforms it into a wonderful spirochèticide. In this property of transforming the salvarsan as well as in the production of antibodies the organism is apparently much injured by the use of alcohol and nicotine.

This article concludes with the statement that the abuse of nicotine before and during the course of and previous to treatment for syphilis prevents the full effect of the remedies employed. Salvarsan, though such a powerful remedy, cannot develop its full effectiveness on patients who indulge in the unrestricted use of cigarettes as was the case in the years immediately after the war. This indulgence of course lowers the resisting powers of the body. In future, therefore, much more attention should be given to avoiding these injurious agents than has heretofore been the case.

Blood Replacement in Intracranial Operations.

DAVIS and CUSHING *(Surgery, Gynecology and Obstetrics,* March, 1925) observe that the method they describe hinges largely upon the routine employment of a suction apparatus as an adjunct to the usual outlay of instruments. Suction has long been used by dentists and others who operate about the mouth as a convenient way to obviate drooling, but its more general use has hardly been appreciated by surgeons at large. During transphenoidal operations for pituitary adenomata, just as in the more common operations for tonsillectomy and other intrabuccal procedures, with a mouth-gag in position and the patient on his back, secretions which gravitate into the pharynx can be removed in this way with much greater celerity than by the use of swabs.

Dr. Clifford B. Walker has devised a suction knife or dissector which he employs in tonsillectomies, so that all blood which escapes in the process of separation of the tonsil is actually drawn down the body of the knife, obscuration of the field being thereby so far precluded that sponging during the process of enucleation is unnecessary.

Surgeons will readily see the many further uses to which this simple adjunct to their operative armamentarium may be put.

The apparatus has been found particularly useful as a means of removing cerebrospinal and other fluids from the depths of wounds. If a cotton-wool pledget is inserted in the region of one of the large arachnoid cisternæ and the "sucker" is applied to it, the cistern can be promptly emptied of its contents. Similarly, the apparatus can be used to remove irrigating fluids which otherwise, if used profusely, so saturate the drapings as to make a sodden and untidy operative environment.

From these early usages the suction apparatus has come to be employed by many assistants for "sponging" in preference to the more commonly employed absorbent substances such as gauze or cotton-wool. And from this routine use in "sponging" the method of blood reinfusion or replacement was a natural step. If the bloody fluid, sucked up by this method of sponging, should be collected in a sterile receptacle, it might after proper treatment be put back into the patient's blood stream should his condition at any time in the course of the operation or at its conclusion appear to indicate the need of an increase in blood volume. On examination of the fluids on one or two occasions they were found to contain a surprisingly high count

of normal appearing erythrocytes. In the earlier cases not only was the blood which had been gathered into the receptacle reinfused, but the blood-soaked cotton pledgets used for sponging or temporary packing during the progress of the operation were collected and wrung out and the fluid thus secured added to that already obtained.

The simple collecting apparatus consists of a sterile flask which is kept in a basin of warm water beneath the operating table. It is fitted with a sterile two-holed rubber stopper. From one hole passes a sterile glass tube attached to a length of rubber tubing which leads to a water faucet providing the suction. Into the other hole is inserted another glass tube with a sterile rubber-tube connection sufficiently long to be easily handled by an assistant. A sterile glass tube of any desired size or angulation fitted into the end of this section of tubing completes the apparatus. The flask is kept in a water-bath at about the temperature of the body. Clotting in the collecting tube as well as in the flask is prevented by sucking up from time to time a few cubic centimeters of 2-per-cent sodium citrate solution. It is evident that the combined fluids obtained in this way will vary greatly in their percentage of red blood corpuscles in accordance with the nature of the operation and of the lesion encountered. It will vary too with the skill and diligence of the assistant in his effort to obtain a "rich" fluid.

If the patient's condition makes the replacement of blood desirable, the fluid is filtered through 40 or 50 thicknesses of sterile gauze into another sterile container. It is again filtered in a like manner into the transfusion graduate. The replacement may be made by the usual gravity method after the introduction of a needle into a vein of the elbow or ankle, or by direct exposure of the vessel and the introduction of a cannula. Upon several occasions, knowing that the tumor to be encountered was highly vascularized, and that in all likelihood there would be a considerable loss of blood on elevating the bone flap or after the enucleation, a cannula has been introduced into the vein before the intracranial operation was started. The lumen of the cannula was, of course, paraffinized and closed by an obturator until the time for its use arose.

Case reports are included in this article proving the value of the method, and further corroborative evidence has been adduced by experimental research.

Certain Inconsistencies in the Treatment of Fractures.

ALBEE *(International Journal of Medicine and Surgery,* March, 1925) observes that since the war period much criticism has been directed toward the circular plaster-of-Paris bandage, largely owing to inadequacy of technique and failure to appreciate fundamental principles. If ever the old adage, "An ounce of prevention is worth a pound of cure," holds good, it does so with reference to terminal swelling resulting from plaster-of-Paris splintage. The limb should be elevated before swelling takes place and not afterward. The wound dressing should never be held in place by a rigid encircling bandage, but by means of the plaster-cotton or whatever material is used to protect the limb when applying the plaster.

Foreign substances, such as metal plates, rings, and wires, all have distinct disadvantages; by destruction or diminution of local tissue resistance to infection, whether introduced at operation or already there in a quiescent form, they may contribute to disastrous postoperative infection. They also occupy the head of the list of causes of non-union.

The lack of biological knowledge is seen when men recommend the use of inlay bone grafts in the presence of infection. Wounds should always be healed at least three to six months before bone-graft work is resorted to. If the former infection has been a stubborn one, such as streptococcus hemolyticus, and the scar is adherent to the bone, it should be resected, not only as a test operation to determine whether a quiescent

infection may be relighted, but also to furnish more favorable vascular soft structures to cover the future graft.

The skin wound following bone-graft operations should always be closed with absorbable suture material and the splintage which has been carefully applied at operation, always including the joint both above and below the field of operation, should not be disturbed, even to make a window, until after the lapse of eight weeks, unless indications of infection arise. It is not the making of the window in the plaster nor the removal of the sutures from the skin that is harmful, but the disturbance of the splintage by the removal of the cotton and the wound dressing, causing unequal splint pressure, that does the damage. The graft should be held as immobile as possible in its gutter throughout the entire vascularizing and osteogenetic period.

During the war period, the Balkan frame was used most frequently, and justly so, a large percentage of the fractures being of gunshot origin with extensive comminution of bone and loss of soft parts. Coaptation splints in any form, including plaster-of-Paris, were thus not only unavailing but, with the danger of gas infection always present, were unadvisable because of the difficulty of properly observing the wound and surrounding tissue. In gas infection, promptitude in diagnosis and action is imperative. Traction applied at the distal end of the extremity, with the limb in a posture of neutral muscle pull, was the best treatment available.

In civil practice, with the indispensable aid of the fracture operating table, the same fundamental methods can be employed in a large percentage of cases, as well as the ideal plaster-of-Paris coaptation splint. The employment of this valuable means of immobilization is almost imperative in securing postoperative immobilization in a large percentage of reconstruction cases.

One should avoid using Steinmann's nail or ice-tongs unless absolutely required, as a number of cases have been observed with local osteomyelitis, infection of soft parts, agglutination of muscle planes, adherence of muscle to bone, and consequent prevention of motion and function of the adjacent joint. Speaking generally, one should refrain from extending the fracture field to a point in close proximity to the joint, as the procedures just mentioned are inclined to do.

Owing to imperfect knowledge of muscle pull, the part is often put up in a faulty position, resulting in imperfect function. The knee is best immobilized in the extended position, the elbow in the flexed position at a right angle, the hip in slight flexion and abduction. Frequently a good result is prevented by too early weight-bearing. Especially is this the case in fractures of the neck of the femur. Proper consideration of practical mechanics would avoid such mistakes. In fractures of the shaft of the femur in the presence of good apposition, there is an end-to-end thrust of one fragment upon the other; whereas in a fracture of the neck of the femur the stress comes at an angle. In the one case, early protected weight-bearing is a stimulus to union, whereas in the other it results in the breaking up of early union. In the case of fractures extending into joints where the fragments are difficult of immobilization, the induction of too early motion tends to cause an excessive callus and impairment of future joint motion, whereas more prolonged immobilization may result in adhesions which will disappear under appropriate physiotherapy.

In an old fracture, pain elicited by weight-bearing or lateral stress signifies imperfect union. In certain fractures, failure to secure adequate immobilization has resulted in the permanent crippling of aged persons, because of the false conception of the surgeon that he was conserving the patient's life, or, as has often been said, treating the patient rather than the fracture. This is especially true in fractures of the neck of the femur in which the practitioner has refrained, because of this same argument, from applying a long plaster-of-Paris spica with the hip in the Whitman abduc-

tion posture. Quite the opposite is true. The patient has less pain upon being placed upon the bedpan or on being moved about in any way. The immobilization thus secured enables the patient to be moved about frequently, thus preventing hypostatic pneumonia. Excruciating pain from coughing or unexpected movement is prevented, and the patient is relieved of nervous strain. Once mastered, it is one of the most important elements of the bone surgeon's armamentarium.

Reviews

SIMPLIFIED NURSING. By Florence Dakin, R. N. Illustrated. The J. B. Lippincott Company, Philadelphia, 1925.

The authoress of this book is the Inspector of Schools of Nursing in the State of New Jersey. We are not quite clear why it should be necessary to have an Inspector for Schools of Nursing, but in these days when everybody and everything must be standardized and inspected it is a fair supposition that the he or she who inspects should be well trained in his or her particular field of endeavor. As we have pointed out before, ordinary nursing does not require the excessive training which is now required in advanced courses of every intelligent woman who wishes to minister to the sick. Of course, it should provide for those who need to be specially trained as surgical or laboratory assistants. However, the vogue at the present time is to make a nurse half a nurse and half a physician, and as long as this vogue is popular books of this character are necessary.

Having begun this notice in a somewhat cynical manner, we may now state that having looked over its pages we have come to the conclusion that it is one of the best, if not the best, that has been prepared for the overburdened female of whom we have spoken. It is a pity that many of the illustrations are rather crude, notably the chart which faces the title-page. Fortunately the text is much better. Unquestionably the average physician will obtain many useful hints as to the bedside care of patients by glancing over its pages. When a second edition is called for, as it undoubtedly will be, we trust that attention be given to the illustrations, which are peculiarly important in this type of book, and we would suggest that Figure 47 showing a patient ready for an abdominal dressing be considerably modified. The posture of the patient in the present figure is entirely unnecessary, distinctly disadvantageous, and even painful.

THE SCIENCE OF BIOLOGY. An Introductory Study by George G. Scott, Ph.D. Thomas Y. Crowell & Company, New York, 1925. Price $3.50.

As the publishers well point out, the wide-spread discussion of evolution at the present time makes the subject of this book of more than usual interest to the laity at least. The title would enable the author to produce many volumes if he were so disposed, but his object has been to present well-known facts to the general public in a way which is interesting and educational. Naturally he covers both plant and animal life, although equally naturally he deals more largely with the animal world, and especially with the vertebrates than with other types. The text proceeds chapter by chapter until it arrives at the last one, which deals with the Biology of Man, at which point Dr. Scott believes that the psychologist and sociologist should take up the theme. The first chapter deals briefly with the Biological Sciences; the second with Protoplasm, and the Physical Basis of Life; the third with The Cell; and then the text goes on to consider the lower forms of plant life, including the bacteria and fungi. In the ninth chapter the Protozoa are considered, and the twenty-second chapter is devoted to Comparative Anatomy with a discussion of the organs of metabolism, the organs of adjustment, and the methods and organs of reproduction in animals.

There is even a chapter upon the Distribution of Animals in Space and Time; another one upon Heredity and Adaptation. Altogether nearly 600 pages are to be found in the volume, accompanied by many illustrations designed to make more clear the words of the text.

APPROACHING MOTHERHOOD. Questions and Answers of Maternity, by George L. Brodhead, M.D. Paul B. Hoeber Co., New York, 1925. Price $1.50.

The text of this little book is arranged as was the text of the Quiz Compend of fifty years ago, and embodies very largely the questions which have been put to the author by expectant mothers in the course of years of experience. There are opening chapters upon the anatomy and physiology of reproductive apparatus, advice as to when the physician should be consulted, and a series of questions and answers designed to meet various accidents which may occur during pregnancy, and others with the preparation for parturition, parturition itself, convalescence, nursing, and the care of the baby. Difficult as it is to produce a medical book intended for the laity, we think that we can cordially recommend this volume to any physician who desires to place a brief and sensible statement in the hands of any one of his patients, particularly if the patient be a primipara.

PHYSICAL DIAGNOSIS AND DISEASES OF THE CHEST. By Joseph H. Pratt, A.M., M.D., and George E. Bushnell, Ph.D., M.D. Illustrated. W. B. Saunders Company, Philadelphia, 1925. Price $5.

The authors tell us that this book has been written with the idea of utilizing the experience gained in the instruction in physical diagnosis of medical officers in the Medical Reserve Officers' camps during the late war. It was found by these writers, as well as by other men ordered for such duty and instruction, that many of those who were given junior commissions were woefully lacking in diagnostic skill.

That portion of the book which deals with diseases of the respiratory apparatus is written by Dr. Bushnell, while that which deals with the circulation is contributed by Dr. Pratt, a method followed it will be recalled in an earlier work on Diagnosis by Norris and Landis, which is considerably more exhaustive. Although the book is entitled "Physical Diagnosis," there is a consideration of the sphygmomanometer and the electrocardiograph as well as the *x*-rays. The illustrations, which are numerous, are nearly all of them taken from German, English or American contributions. The book is one which can be used by students with advantage, but whether teachers will wish to displace text-books already in existence by this one remains to be seen.

THE MEDICAL CLINICS OF NORTH AMERICA, May, 1925. Illustrated. W. B. Saunders Company, Philadelphia, 1925. Price $16 for 6 numbers.

In this issue of the Medical Clinics of North America there are nineteen contributors who are connected with the hospitals and other institutions of Boston. The subjects vary from Congenital Heart Disease to Gout, Coronary Occlusion, Peptic Ulcer and Cholecystitis, Thyroid Failure without Myxedema, Diabetic Coma and its Treatment, and a number of other definitely medical reports of cases.

MODERN SURGERY, GENERAL AND OPERATIVE. By J. Chalmers Da Costa, M.D., LL.D., F.A.C.S. Ninth edition, revised and reset. Illustrated. W. B. Saunders Company, Philadelphia and London, 1925. Price $10.00 net.

The reception accorded to Da Costa's Modern Surgery, attested by this its ninth edition, can be attributed to its author's clarity and brilliancy of style, his power of selecting and emphasizing essentials and setting forth each subject in its due proportion, and his extraordinary ability to do this in few words. That he should have been able to present so much in such small space, to condense without losing in lucidity, or greatly in completeness of detail, the entire subject of Surgery in between 1400 and 1500 pages, is one reason why his book finds highest favor with students and with general practitioners. He has made all this information promptly available by an excellent index. There is a delightful preface, with a literary touch, and its generous acknowledgment of debts to others. Thereafter

the subject-matter is arranged somewhat as has been formulated in his previous editions and in other text-books on surgery. There is a chapter upon *x*-rays in surgery, one upon electrothermic methods, one upon radium and combined methods of treatment, and a final one on injuries by electricity. The illustrations are excellent and, as they should, supplement and elucidate the text.

Da Costa accepts the controverted teaching that tuberculosis may be congenital. He gives an excellent discussion of the various tuberculin tests and reactions and also of tuberculin treatment; of serum treatment, of treatment by congestive hyperemia, of heliotherapy, and by the Finsen light. Bearing on shock, distinction is made between shock and collapse. The various theories as to the nature of this complication of injuries are briefly discussed.

There is a section on multiple wounds in war and their treatment, with the need of systematic bacteriological examination set forth. Modern methods of treatment are given in detail; the modified Carrel-Dakin technique and the ablation of dead and infected tissue being especially stressed.

Irritation by poison-gases is discussed, with a description of the gas mask. There is a section on syphilis, covering the essential points of diagnosis and treatment. Transfusion of blood is considered at length and in detail. There is a noteworthy section on the determination of the cause of coma, based on a large experience and profitable alike to both physician and surgeon. Urotropin is advised in all decompressive operations on the skull. There is an excellent section on war wounds. Both Sylvester and Schäfer methods of artificial respiration are described and illustrated. Bearing on enteroptosis Da Costa exhibits no enthusiasm for the various forms of surgical intervention, though the operations are given the space and detail they deserve. For the cure of internal hemorrhoids that require operation Da Costa prefers the clamp and cautery. An excellent chapter upon anesthesia describes the various methods which have their individual or group advocates. There is a section on gonorrhea and a summary of genito-urinary surgery. Diseases of the breast are considered at some length. Throughout the book credit is given to him to whom it is due.

In a comparatively small space Da Costa has not only set forth the accredited surgical practices of to-day, but has so enriched his text by references that those who seek more detailed knowledge on practically any surgical subject may readily find it.

The surgeon, the physician, the specialist, the student of medicine, will find in this book such help as will make it a work of frequently recurring reference, or continuous study.

A Practice of Gynæcology. By Henry Jellett, M.D. (Dublin University), F.R.C.P.I. Fifth edition. Illustrated. Lea & Febiger, Philadelphia, 1925. Price $8.50.

This fifth edition of Jellett's Gynecology, put forth in the publishers' best style, profusely and admirably illustrated, includes added chapters on Gas Inflation of the Peritoneal Cavity and the Fallopian Tubes, Ovarian Transplantation, the Manchester Treatment of Uterine Prolapse, and Implantation Adenomata of Endometrial Origin; also chapters on Sterility and on the General Principles that Govern Gynecological Operations.

The arrangement of the book is that commonly adopted by authors of text-books on this subject.

The first chapter is devoted to Diagnosis of Gynecological Cases and is extremely well done. Menstruation and its Disorders is briefly treated, with the therapeutics receiving that light touch which, in the case of Membranous Dysmenorrhea, is justifiable.

Throughout the author has excellently summarized his subject in a little more than 700 pages.

This book the practitioner or surgeon who does an occasional gynecological operation will find helpful. The student will find that it admirably supplements that practical course of instruction which now obtains in all first-class medical schools.

Notes and Queries

The New Light on Cancer.

The daily papers have had so much to report about the work of Gye and Barnard that our readers will be interested to know that the *Lancet* of July 18, 1925, contains their reports and in a long editorial discusses this important topic. We append a small part of this editorial because it gives succinct ideas concerning the matter:

"These observations may represent a solution of the central problem of cancer. His carefully controlled experimental evidence leads to certain fundamental conclusions which may be briefly summarized as follows:

"1. All malignant new growths contain an ultra-microscopic virus—or group of viruses—which can be cultivated. This applies to the carcinomata and sarcomata of fowl, mice, rats, dogs, and man. The virus resides probably within the cells of the neoplasms.

"2. The virus alone, washed free from all adherent material, does not produce a tumor when injected, and does not even produce a visible lesion.

"3. But when injected together with virus-free extracts of tumors the virus produces a malignant new growth. The extracts contain, therefore, a substance called by Dr. Gye the 'specific factor,' which enables the virus to attack the cells of the injected animal so as to transform them into cancer cells.

"4. There is no species specificity so far as the virus is concerned, for tumors can be obtained in one species of animals with the virus obtained from the tumor of another species.

"5. The 'specific factor' shows a very strict specificity of species. Thus in order to produce a malignant new growth in a mouse it is necessary to use the specific factor from a mouse tumor, while the specific factor of a chicken tumor is ineffective.

"6. There is probably also a strict specificity of tissue for the specific factor. So far only sarcomata have been obtained, and these only with a mixture of virus and the specific factor from sarcomata, not from carcinomata.

"The existence of a virus is not merely postulated from the effects of a culture supposed to contain it, as has hitherto been the case. The paper by Mr. J. E. Barnard on 'The Microscopical Examination of Filterable Viruses' follows Dr. Gye's communication, and in this he has applied the optical methods elaborated by him for the study of the organisms of bovine pleuro-pneumonia, the largest of the known filter-passing viruses, to the study of the cancer viruses cultured by Dr. Gye, and shows that he has succeeded in rendering the cancer virus visible and even in photographing it. This is in itself a great achievement. The results of Mr. Barnard's observation so closely correspond with the experimental results obtained by Dr. Gye that the existence of a living cancer virus would appear to be established. The reasons for this broad opinion follow.

"In order to make clearer the relationship existing between the virus and the specific factor, definite examples may be given. We will call the virus obtained from a mouse tumor 'mouse virus,' from a human tumor 'human virus,' and so on. Similarly we will call the 'specific substance' obtained from a mouse carcinoma 'mouse carcinoma specific,' from a human carcinoma 'human carcinoma specific,' from a fowl sarcoma 'fowl sarcoma specific,' and so on. Then the following relationships have been established experimentally after injection:

"(*a*) Any virus alone from any neoplasm into any animal: no effect.

"(*b*) Any specific from any neoplasm into any animal: no effect.

"(*c*) Mouse carcinoma virus + fowl sarcoma specific: (1) Injected into mice—no effect; (2) injected into fowl—sarcoma.

"(*d*) Human carcinoma virus + fowl sarcoma specific injected: Into mice—nothing; into fowl—sarcoma.

"It follows, therefore, that the type of

malignant new growth that is produced depends not upon the virus, but upon the specific substance. There are, therefore, two factors concerned in the etiology of cancer: (1) A living virus—the extrinsic factor; and (2) a chemical substance produced by the cells—the intrinsic factor.

"The 'germ theory' of cancer is, of course, not a new one. It has often been advanced and has as often been rejected. It has been pointed out in the past, and quite truly, that it does not explain cancer. Recently an American authority on cancer has gone so far as to make the categorical statement: 'There are many things which we do not know about cancer to-day, but there is one thing that we do know and that is that it is not of germ origin.' That is not merely the opinion of a single individual, but it represents the view of almost every pathologist of repute. That view is not merely justified by the consideration that in the past no one has ever isolated an organism which when injected would produce with certainty a typical malignant new growth. As we see it is true even to-day in the light of Dr. Gye's work to say that the presence of an organism *by itself* cannot account for the fundamental features of cancer, and if the statement quoted above had been formulated in this way no exception could be taken to it. The position may be stated more generally by saying that cancer cannot be explained by postulating an entirely extrinsic origin.

"Dr. Gye's work shows that there is both an extrinsic and an intrinsic factor concerned in the etiology of cancer. The extrinsic factor is a virus common to all neoplasms. By itself it is incapable of producing a neoplasm. To do that it requires the intrinsic factor—a substance produced by the cells which enables the virus to attack the cells. The virus can be cultivated. The intrinsic factor which so far has been demonstrated only in different tumors is presumably produced by the cells in the course of chronic irritation. The intrinsic factor varies from tissue to tissue and from tumor to tumor. In such tumors as those observed by Rous it is abundant and very resistant, so that it persists even in an extract made without special precautions; in most other tumors it is present in small amounts and very labile, so that special anaerobic conditions are necessary to preserve it and to demonstrate its existence. This apparently fundamental difference between the Rous tumors and other tumors is, therefore, merely the manifestation of different degrees of lability of this specific substance. Experimental cancer research has brought to light a number of other facts, the explanation of which has hitherto presented great difficulties. As an instance we may mention the development of sarcomata in the course of the experimental propagation of certain carcinomata as described by Ehrlich, by Haaland, and by Russell. For all these difficulties Dr. Gye's work offers a satisfying solution—a good test of the value of the conception which he has formulated of the etiology of cancer. As already stated, Dr. Gye has succeeded in producing a sarcoma with the virus obtained from a carcinoma. The reverse result has not yet been attained—nor has it ever been observed to occur spontaneously in the course of the experimental propagation of sarcomata.

"The work of Dr. Gye is the outcome of an investigation on ultramicroscopic viruses instituted by the Medical Research Council. A group of men were appointed to work in different special directions, a member of which, Dr. P. P. Laidlaw, gave invaluable help towards finding the direction in which new researches might most profitably proceed. The Medical Research Council is to be congratulated on having secured the services of Dr. Gye and Mr. Barnard, whose successful work has opened up a new chapter in the investigation of disease. We have stated at the outset that we hold Dr. Gye's work to be a solution of the central problem of cancer. But it is more than that. Dr. Gye has also evolved a technique for cultivating ultramicroscopic viruses and a method of testing for their presence."